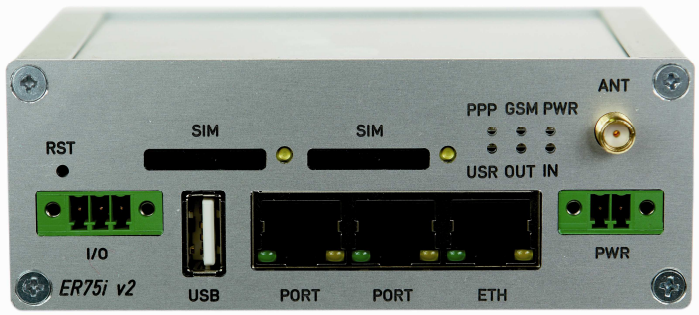
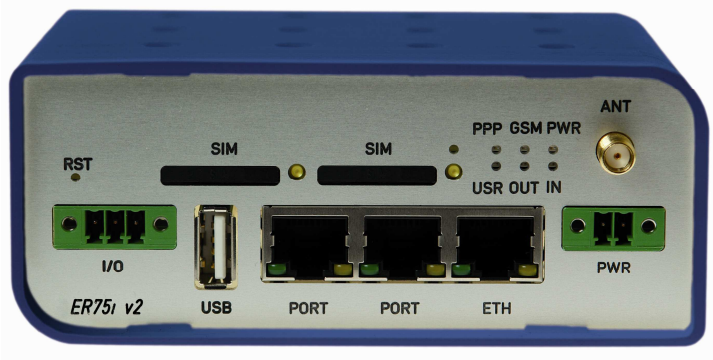
EDGE router ER75i v2
and ER75i v2 SL

USER'S GUIDE





LUCOM GmbH * Ansbacher Str. 2a * 90513 Zirndorf * Tel. 09127/59 460-10 * Fax. 09127/59 460-20 * www.lucom.de

Contents

1. Safety instruction 5
2. Description of the router 6
   2.1. Introduction 6
   2.2. Delivery Identification 7
   2.3. Antenna Connection 8
   2.4. SIM Card Reader 9
   2.5. Power Supply 9
   2.6. Technical parameters 9
   2.7. Description of the individual components of the router 10
      2.7.1. GSM/GPRS/EDGE module 10
      2.7.2. Control microcomputer 10
   2.8. User interfaces (Connectors) 11
      2.8.1. Connection of the PWR Supply Connector 12
      2.8.2. Connection of binary input and output 12
      2.8.3. Connection of the Port1 Connector – RS232 13
      2.8.4. Connection of the Port1 Connector – RS485 14
      2.8.5. Connection of the Port1 Connector – RS422 15
      2.8.6. Connection of the Port1 Connector – M-BUSD 16
      2.8.7. Connection of the Port1 Connector – CNT 17
      2.8.8. Connection of the ETH Connector 18
      2.8.9. Connection of the Connector USB 18
   2.9. Technical specification of optional PORT1 and PORT2 19
   2.10. Technical specification of Binary input and output 23
   2.11. Modem status indication 23
   2.12. Putting into operation 24
   2.13. Mechanical external dimensions and mounting recommendations 24
3. Expansion port mounting 28
   3.1. Expansion port mounting for ER75i v2 28
   3.2. Expansion port mounting for ER75i v2 SL 30
4. Changing the SIM cards 32
5. Ordering code routers 33
   5.1. Basic version 33
   5.2. Full version 33
6. Configuration setting over web browser 34
   6.1. Network Status 35
   6.2. DHCP Status 36
   6.3. GPRS Status 36
   6.4. IPsec status 37
   6.5. DynDNS status 38
   6.6. System Log 38
   6.7. LAN Configuration 39
   6.8. VRRP Configuration 43
   6.9. GPRS Configuration 45
   6.10. Firewall Configuration 48
   6.11. NAT Configuration 50
   6.12. OpenVPN Tunnel Configuration 53
   6.13. IPSec Tunnel Configuration 56
   6.14. GRE Tunnels Configuration 58

6.15. L2TP Configuration 60
6.16. DynDNS Client Configuration 62
6.17. NTP Client Configuration 63
6.18. SNMP Configuration 63
6.19. SMTP Configuration 65
6.20. SMS Configuration 66
6.21. Expansion Port Configuration 73
6.22. USB Port Configuration 74
6.23. Startup Script 76
6.24. Up/Down Script 77
6.25. Automatic update configuration 77
6.26. Change profile 78
6.27. Change password 78
6.28. Set real time clock 79
6.29. Set SMS service center address 79
6.30. Unlock SIM card 79
6.31. Send SMS 79
6.32. Backup Configuration 80
6.33. Restore Configuration 80
6.34. Update firmware 80
6.35. Reboot 81
6.36. Default settings 81
6.36.1. LAN Configuration 81
6.36.2. VRRP Configuration 82
6.36.3. Firewall Configuration 82
6.36.4. GPRS Configuration 83
6.36.5. NAT Configuration 84
6.36.6. OpenVPN Tunnel Configuration 85
6.36.7. IPsec Tunnel Configuration 86
6.36.8. GRE Tunnels Configuration 87
6.36.9. L2TP Tunnel Configuration 87
6.36.10. DynDNS Configuration 87
6.36.11. NTP Configuration 88
6.36.12. SNMP Configuration 88
6.36.13. SMTP Configuration 88
6.36.14. SMS Configuration 89
6.36.15. Expansion Port Configuration 90
6.36.16. USB Port Configuration 90
6.36.17. Startup script 91
6.36.18. Up/Down Script 91
6.36.19. Automatic update 92
7. Configuration setting over Telnet 93
8. Possible problems 94
9. Reference 94
10. FAQ 94
11. Customers support 95
12. Product disposal instructions 96
13. Guarantee Claim Guidelines 97
14. Guarantee certificate 100

Symbols used

Danger – important notice, which may have an influence on the user's safety or the function of the device.

Attention – notice on possible problems, which can arise in specific cases.

Information, notice – information, which contains useful advice or special interest.

GPL licence

Source codes under GPL licence are available free of charge by sending an email to info@conel.cz.

Declared quality system
ISO 9001

Conel s.r.o., Sokolska 71, 562 04 Usti nad Orlici, Czech Republic
Issue in CZ, 5/16/2011

1. Safety instruction

Please, observe the following instructions:

- The communication module must be used in compliance with all applicable international and national laws and in compliance with any special restrictions regulating the utilization of the communication module in prescribed applications and environments.
- To prevent possible injury to health and damage to appliances and to ensure that all the relevant provisions have been complied with, use only the original accessories. Unauthorised modifications or utilization of accessories that have not been approved may result in damage to the communication module and in a breach of applicable regulations. Unauthorized modifications or utilization of accessories that have not been approved may result in the termination of the validity of the guarantee.
- The communication module must not be opened.
- **Caution!** The SIM card could be swallowed by small children.
- Voltage at the feed connector of the communication module must not be exceeded.
- Do not expose the communication module to extreme ambient conditions. Protect the communication module against dust, moisture and high temperature.
- It is recommended that the communication module should not be used at petrol stations. We remind the users of the duty to observe the restrictions concerning the utilization of radio devices at petrol stations, in chemical plants, or in the course of blasting works in which explosives are used.
- Switch off the communication module when travelling by plane. Utilization of the communication module in a plane may endanger the operation of the plane or interfere with the mobile telephone network, and may be unlawful. Failure to observe these instructions may result in the suspension or cancellation of telephone services for the respective client, or, it may result in legal sanctions; it may also result in both eventualities.
- When using the communication module in the close proximity of personal medical devices, such as cardiac pacemakers or hearing aids, you must proceed with heightened caution.
- If it is in the proximity of TV sets, radio receivers and personal computers, the telephone may cause interference.
- It is recommended that you should create an appropriate copy or backup of all the important settings that are stored in the memory of the device.

2. Description of the router

2.1. *Introduction*

EDGE router is a compact electronic device based on the module which enables data transfers using GSM, GPRS and EDGE technologies.

Primarily, the router expands the capabilities of the module by the option of connecting more PCs by means of the built-in Ethernet interface. In addition, the firmware of the router provides automatic establishment and maintenance of GPRS connection. By means of integration of a DHCP server it provides the users with simple installation and Internet access.

In addition, the router is equipped with a USB 2.0 Host interface which is designed only for connection to a USB device.

By customer request it is possible to equip the router with the PORT1 module, PORT2 module and extend the function of the EDGE router about RS232, RS485/RS422, ETHERNET, M-BUSD or CNT (I/O module).

The EDGE router has two versions. The first version is basic ER75i v2 and the second version is ER75i v2 SL in the aluminum box.

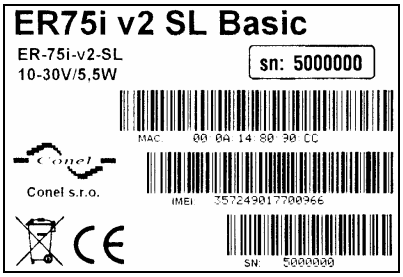
Examples of Possible Applications

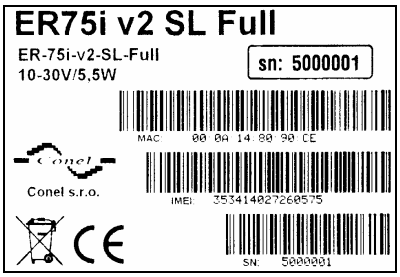
- mobile office
- fleet management
- security system
- telematic
- telemetric
- remote monitoring
- vending and dispatcher machines

2.2. *Delivery Identification*

Specimen Label:

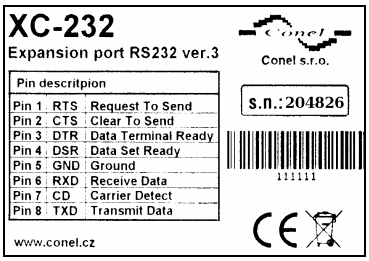
Trade name	Type name	Other
ER75i v2 Basic	ER75i -5-v2	Basic version
ER75i v2 SL Basic	ER75i -5-v2-SL	Basic version in the aluminum box
ER75i v2 Full	ER75i -5-v2-Full	Full version
ER75i v2 SL Full	ER75i -5-v2-SL-Full	Full version in the aluminum box

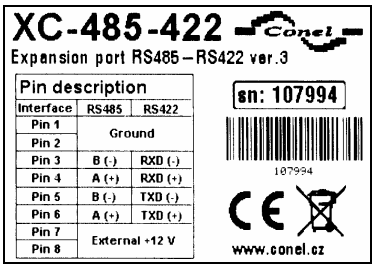


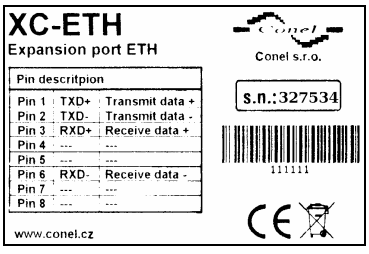


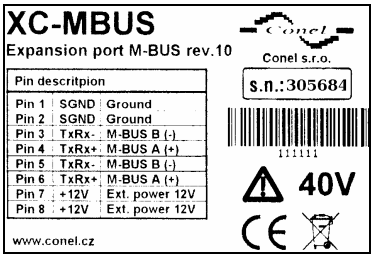
Example of expansion port PORT1:

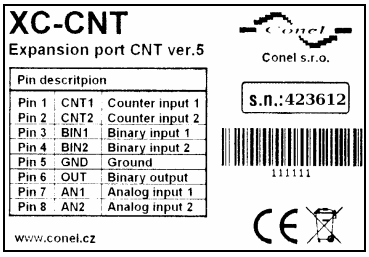
Trade name	Type name	Power supply
Expansion port RS232	XC-232	Internal power supply
Expansion port RS485-RS422	XC-485422	Internal/external power supply
Expansion port ETHERNET	XC-ETH	Internal power supply
Expansion port M-BUSD	XC-MBUSD	External power supply
Expansion port CNT	XC-CNT	Internal power supply










XC-CNT
Expansion port CNT ver.5
Conel s.r.o.
s.n.:423612
Pin descritpion
Pin 1 CNT1 Counter input 1
Pin 2 CNT2 Counter input 2
Pin 3 BIN1 Binary input 1
Pin 4 BIN2 Binary input 2
Pin 5 GND Ground
Pin 6 OUT Binary output
Pin 7 AN1 Analog input 1
Pin 8 AN2 Analog input 2
www.conel.cz

Basic delivered set of router includes:

- EDGE router,
- power supply,
- crossover UTP cable,
- external antenna,
- clips for the DIN rail,
- installation CD containing instructions.

In addition to the basics it is possible to deliver:

- one or two expansion ports RS232, RS485/RS422, ETHERNET, M-BUSD or CNT (separation columns are in distribution),

Module can be connected only as follows.

PORT1	RS232, RS485/422, ETHERNET, M-BUSD, CNT
PORT2	RS232, RS485/422, M-BUSD

The router standard designed for:

- mounting to a panel using through holes (only ER75i v2 version),
- possibility to be put on a work surface,
- for mounting onto a DIN rail, the clips are included.

2.3. *Antenna Connection*

The antenna is connected to the router using the SMA connector on the front panel.

External antennas:

2.4. *SIM Card Reader*

The SIM card reader for 3 V and 1.8 V SIM cards is located on the front panel of the router. To initiate the router into operation it is necessary to insert an activated SIM card with unblocked PIN in the reader. The SIM cards might be of different adjusted APN (Access Point Name).

2.5. *Power Supply*

The router requires +10 V DC to +30 V DC supply. Protection against reversed polarity without signaling is built into the router.

The power consumption during receiving is 1W. The peak power consumption during data sending is 5.5W. For correct operation it is necessary that the power source is able to supply a peak current of 500mA.

2.6. *Technical parameters*

ER75i v2		
Complies with standards		EN 301 511, V9.0.2 EN ETSI 301 489-1 V1.9.1 EN 60950-1:06 ed.2 + A11:09
Frequency bands		EGSM850, EGSM900, GSM1800 and GSM1900
Transmit power		Class 4 (2 W) for EGSM850 Class 4 (2 W) for EGSM900 Class 1 (1 W) for GSM1800 Class 1 (1 W) for GSM1900
Temperature range	Operation Storage	-30 °C to +60 °C -40 °C to +85 °C
Protection rating	Freely In switch board	IP20 IP56
Supply voltage		+10 až +30 V DC
Consumption	Reception Transmission	1 W 5,5 W
Dimensions		42x76x113 mm (DIN 35mm)
Weight		ER75i v2 – 150 g ER75i v2 SL – 280 g
Antenna connector		SMA – 50 Ohm
User interface	ETH USB PORT1 PORT2	Ethernet (10/100 Mbit/s) USB 2.0 type A host Optional RS232/RS485/ETHERNET/M-BUSD or inputs/outputs (I/O) Optional RS232/RS485/M-BUSD

LUCOM GmbH * Ansbacher Str. 2a * 90513 Zirndorf * Tel. 09127/59 460-10 * Fax. 09127/59 460-20 * www.lucom.de

2.7. *Description of the individual components of the router*

2.7.1. GSM/GPRS/EDGE module

The EDGE/GPRS module is used for GSM network wireless communication. It is integrated into the printed circuit board. The two slide-out SIM card readers is accessible from the front panel. The SMA antenna connector is accessible from the front panel.

GSM/GPRS/EDGE module

- Communicates in four GSM bands (850MHz, 900MHz, 1800MHz, and 1900MHz).
- In the GPRS mode it is able to transmit in three „Time Slot“ and receive in two (GPRS multi-slot class 10 – the maximum bit rate of reception is 42.8 kb/s) or transmit in one „Time Slot“ and receive in four (GPRS multi-slot class 12 – the maximum bit rate of reception is 85.6 kb/s).
- In the EDGE mode it is able to transmit in three „Time Slot“ and receive in two (EDGE multi-slot class 10 – the maximum bit rate of reception is 118.4 kb/s) or transmit in one „Time Slot“ and receive in four (GPRS multi-slot class 12 – the maximum bit rate of reception is 236.8 kb/s).
- Supports coding schemes CS1 to CS4 and MCS1 to MCS9.

Beware! The transmitting and receiving in timeslots depends on the operator networks possibilities.

2.7.2. Control microcomputer

The core of the router is a 32-bit ARM microprocessor with 512MB DDR2 SDRAM, 128MB FLASH, 1MB MRAM, serial interface RS-232 and an Ethernet interface 10/100 Mbit/s. The microcomputer is connected to the EDGE EES3 module through the USB interface and controls the communication via EDGE/GPRS. Towards to the user it is connected on the Ethernet interface.

The software is built on the Linux operating system.

The router support services as like DHCP, NAT, Open VPN, IPsec tunnels, etc.

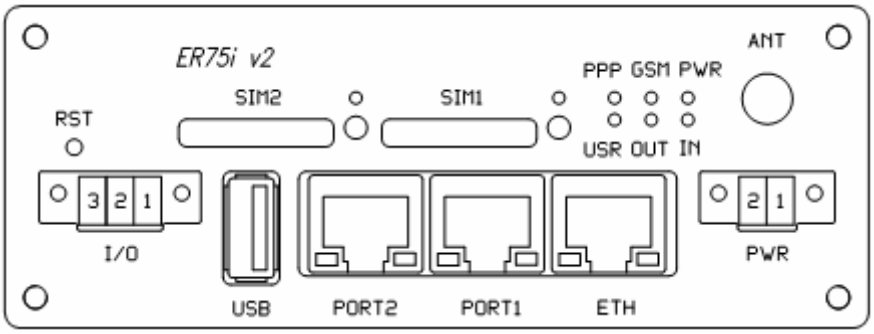
The modem settings are saved in the FLASH memory. All modem configurations can be done through a web interface (HTTP), which is protected by security password.

Actual firmware version: 2.1.1 (4.5.2011)

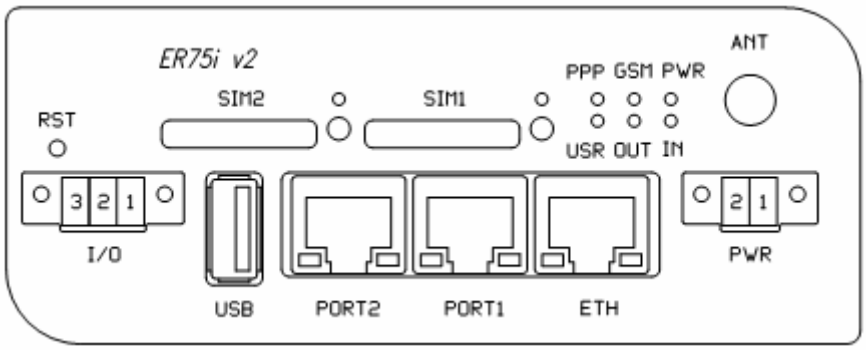
2.8. *User interfaces (Connectors)*

On the front and back panel of router the following connectors are located

- one MRT 2pin connector (PWR) – for connection of the power supply adapter
- one RJ45 connector (ETH) – for connection into the local equipment
- one RJ45 connector (optional PORT1) – for connection of the local any arrangement over RS232, RS485/422, ETHERNET, M-BUSD or CNT
- one RJ45 connector (optional PORT2) – for connection of the local any arrangement over RS232, RS485/422, M-BUSD
- one FME or SMA connector (ANT) – for connection of the antenna
- one USB-A Host connector (USB) – for connection of the devices to the router, USB supports equipments with PL-2303 and FTDI USB/RS232 converter
- One MRT 3pin connector (I/O) – for connection of the binary input and output



Front panel ER75i v2 SL.



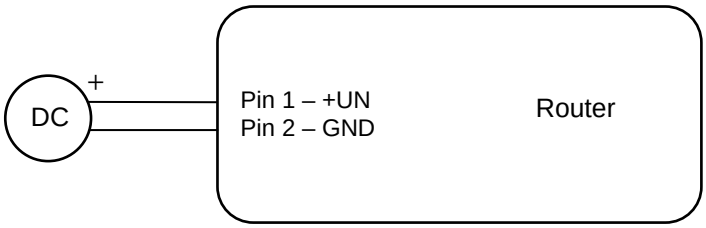
Front panel ER75i v2.

2.8.1. Connection of the PWR Supply Connector

Panel socket MRT 2pin.

Pin number	Signal mark	Description
1	+UN	Positive pole of DC supply voltage (+10 to +30 VDC)
2	GND	Negative pole of DC supply voltage

Circuit example:



The positive pole +UN is marked by a red socket on the power supply.

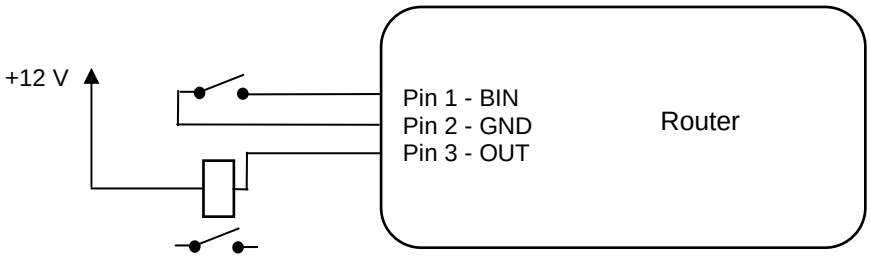
2.8.2. Connection of binary input and output

Panel socket MRT 3pin.

Pin no.	Signal mark	Description	Data flow direction
1	BIN0	Binary input	Input
2	GND	Ground – signal ground	
3	OUT0	Binary output	Output

The user interface I/O is for processing of binary input signal and to control (settings) of binary output signal. Binary output is not switched to ground, by default configuration.

Circuit example of a Binary or output equipment with router:

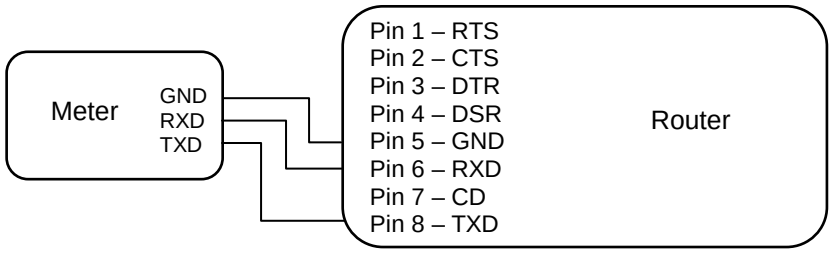


2.8.3. Connection of the Port1 Connector – RS232

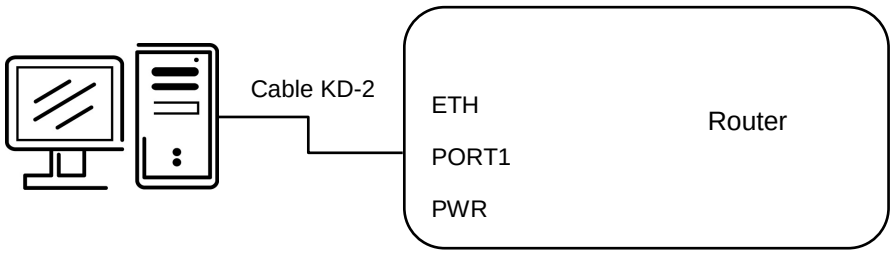
Panel socket RJ45 (RS232 – DCE – Data Communication Equipment).

Pin number	Signal mark	Description	Data flow direction
1	RTS	Request To Send	Input
2	CTS	Clear To Send	Output
3	DTR	Data Terminal Ready	Input
4	DSR	Data Set Ready – connected to +4 V through 330 Ohm	Output
5	GND	GROUND – signal ground	
6	RXD	Receive Data	Output
7	CD	Carrier Detect	Output
8	TXD	Transmit Data	Input

Circuit example:

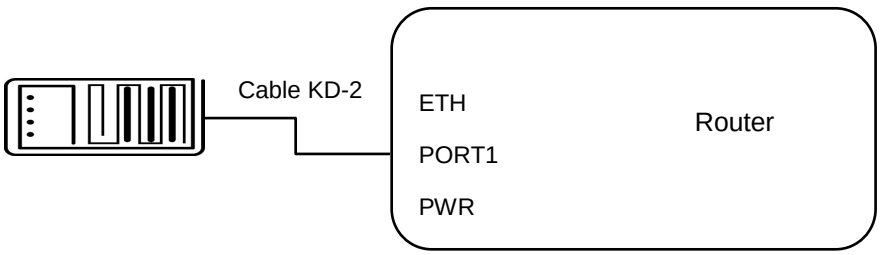


The router connection to the PC:



- cable KD2 is connected to serial port PC (example COM1)

The router connection to equipment with full-value RS232 interface:



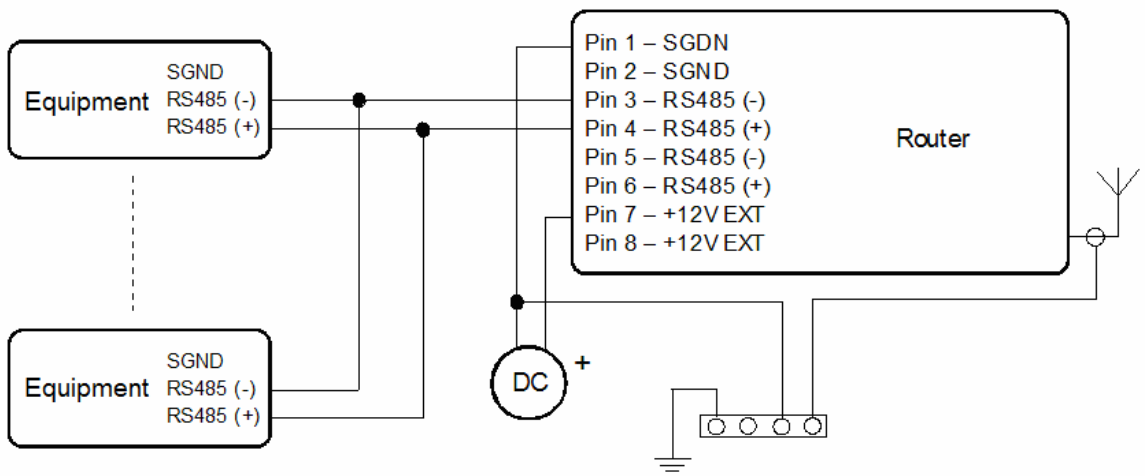
2.8.4. Connection of the Port1 Connector – RS485

Panel socket RJ45.

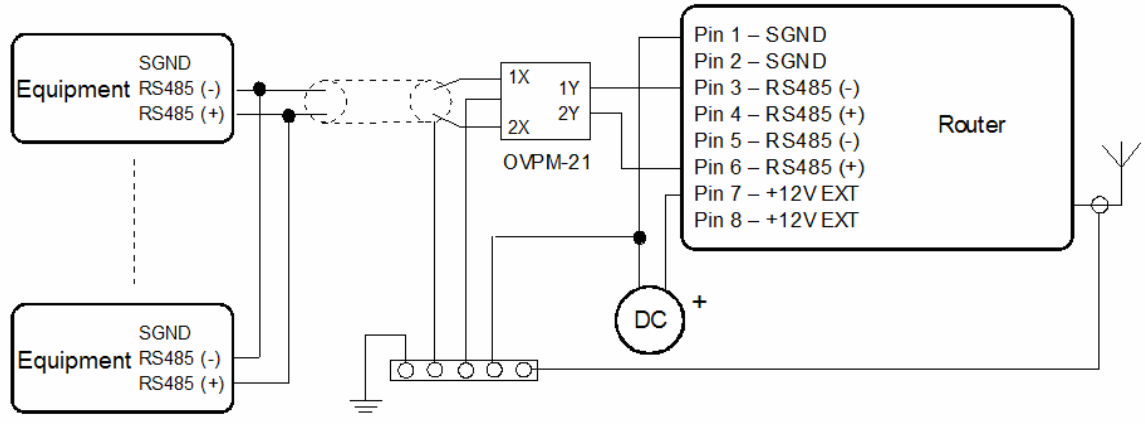
Pin number	Signal mark	Description	Data flow direction
1	GND	Signal and supply ground	
2	GND	Signal and supply ground	
3	TxRx-	RS485 B (-)	Input/Output
4	TxRx+	RS485 A (+)	Input/Output
5	TxRx-	RS485 B (-)	Input/Output
6	TxRx+	RS485 A (+)	Input/Output
7	+12 V EXT	External power supply	
8	+12 V EXT	External power supply	

ATTENTION! Power supply is selected on the expansion port RS485 by help of a jumper, 2.11. If galvanic separation is required the converter must have an external power supply.

Circuit example of the equipment with a router with data cable length less than 10 m:



Circuit example of the equipment with a router with data cable length more than 10 m:



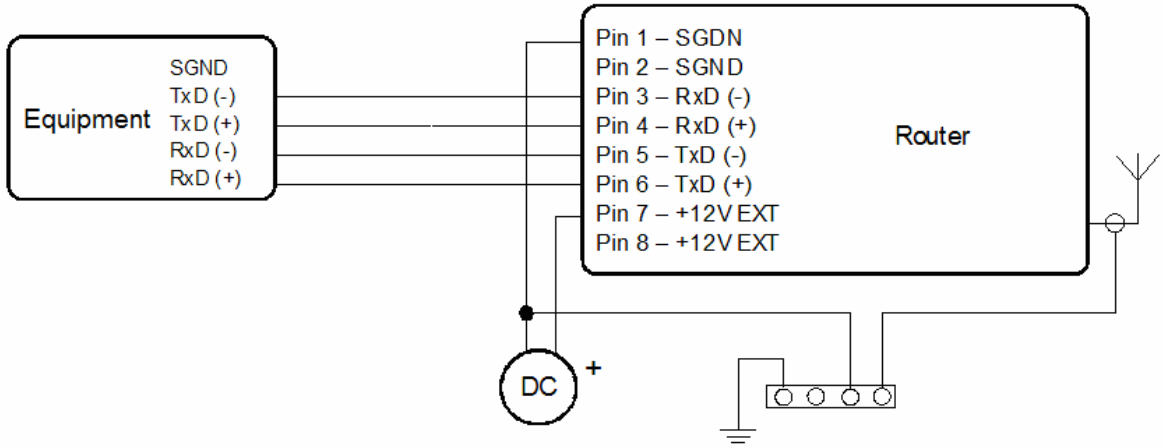
With a RS485 data cable more than 10m it is necessary to use overvoltage protection on the router side!

2.8.5. Connection of the Port1 Connector – RS422

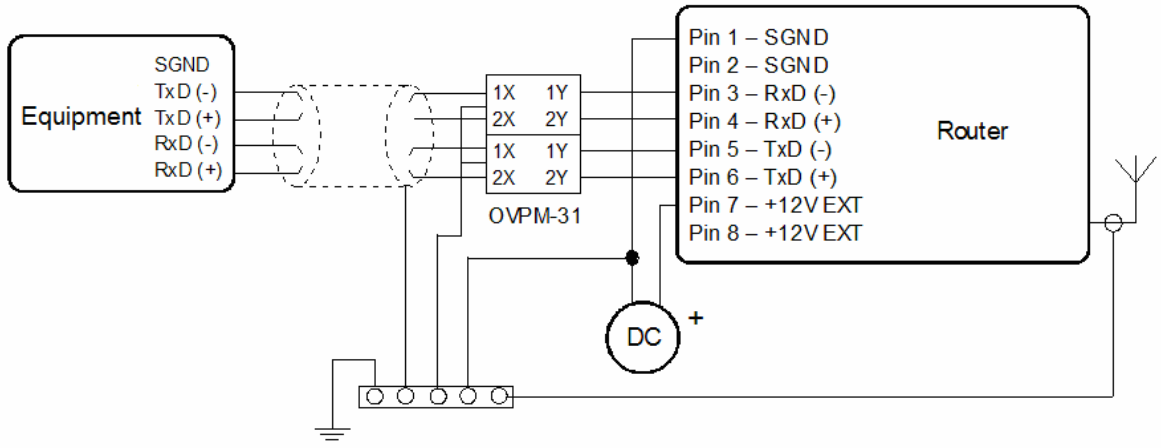
Pin number	Signal mark	Description	Data flow direction
1	SGND	Signal and power supply ground	
2	SGND	Signal and power supply ground	
3	RxD-	Receive Data (-)	Output
4	RxD+	Receive Data (+)	Output
5	TxD-	Transmit Data (-)	Input
6	TxD+	Transmit Data (+)	Input
7	+12V EXT	External power supply	
8	+12V EXT	External power supply	

ATTENTION! Power supply is selected on the expansion port RS422 by help of a jumper, 2.9. If galvanic separation is required the converter must have an external power supply.

Circuit example of the equipment with router with data cable length less than 10 m:



Circuit example of the equipment with a router with data cable length more than 10 m:



With a RS422 data cable more than 10m it is necessary to use overvoltage protection on the router side!

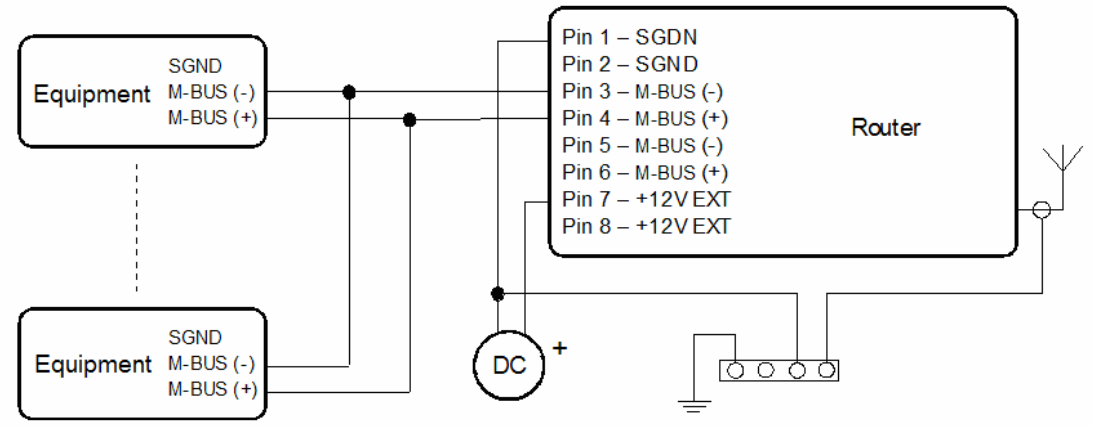
2.8.6. Connection of the Port1 Connector – M-BUSD

Panel socket RJ45.

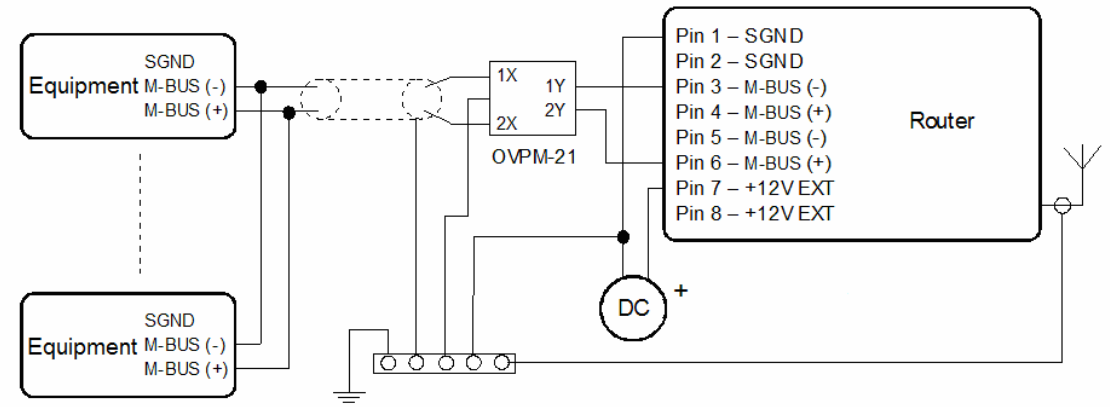
Pin number	Signal mark	Description	Data flow direction
1	GND	Signal and supply ground	
2	GND	Signal and supply ground	
3	TxRx-	M-BUS B (-)	Input/Output
4	TxRx+	M-BUS A (+)	Input/Output
5	TxRx-	M-BUS B (-)	Input/Output
6	TxRx+	M-BUS A (+)	Input/Output
7	+12 V EXT	External power supply	
8	+12 V EXT	External power supply	

ATTENTION! External supply is for converter M-BUSD!
If galvanic separation is required the converter must have external power supply.

Circuit example of the equipment with a router with data cable length less than 10 m:



Circuit example of the equipment with a router with data cable length more than 10 m:



With a M-BUS data cable more than 10m it is necessary to use overvoltage protection on the router side!

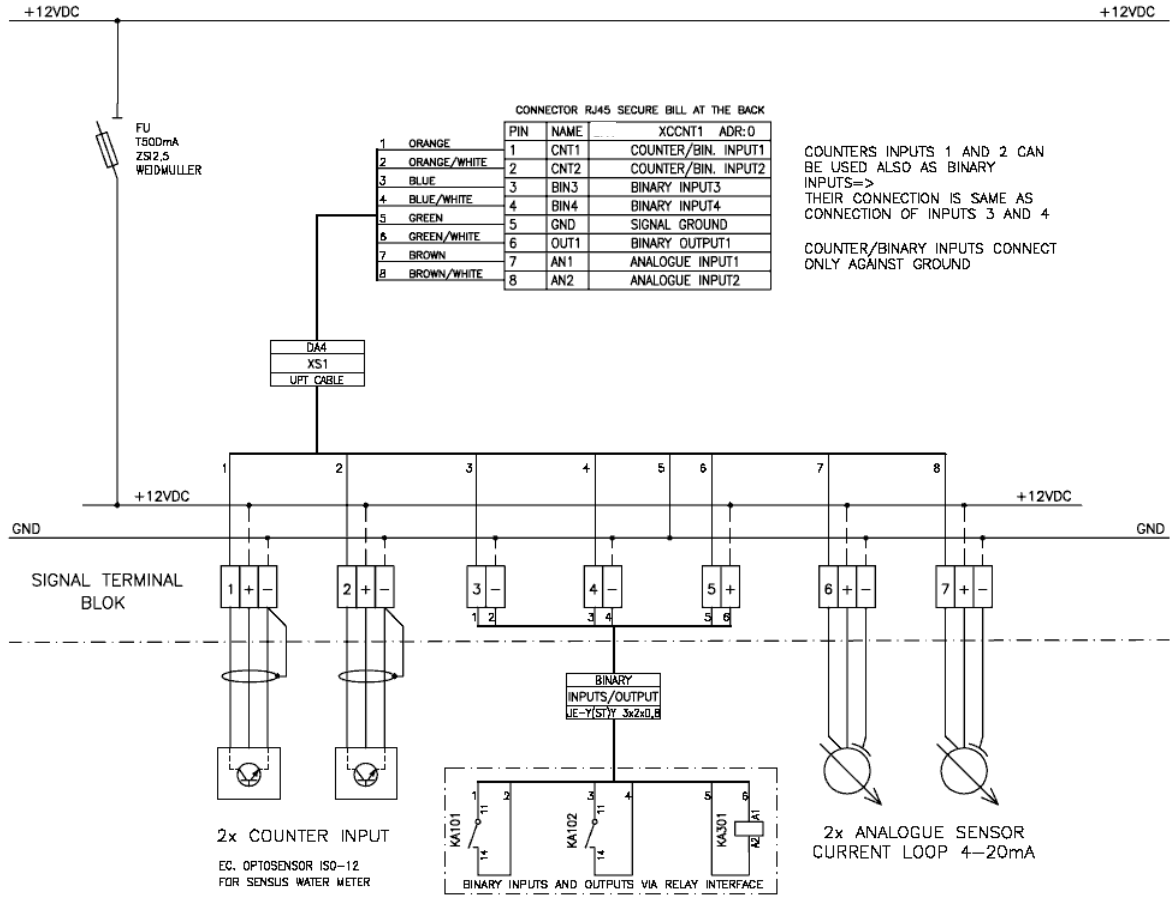
2.8.7. Connection of the Port1 Connector – CNT

Panel socket RJ45.

Pin number	Signal mark	Description	Data flow direction
1	BIN1/CNT1	Binary input/counter input	Input
2	BIN2/CNT2	Binary input/counter input	Input
3	BIN3	Binary input	Input
4	BIN4	Binary input	Input
5	GND	Signal ground	
6	OUT1	Binary output (open collector)	Output
7	AN1	Analogue input	Input
8	AN2	Analogue input	Input

The user interface CNT is for monitoring and processing of analogue and binary signals and to control (settings) of binary signals. Available are 2 counter and 2 binary inputs or 4 binary inputs, 2 analogue inputs and 1 binary output. The settings of binaries and counter inputs by the help of firmware in which the single input and output is defined. Binary output is off by default configuration (it is not switched to ground).

Typical connection of the router measuring circuits:



The router does not support to modify any signals of the CNT port, for example logical functions.

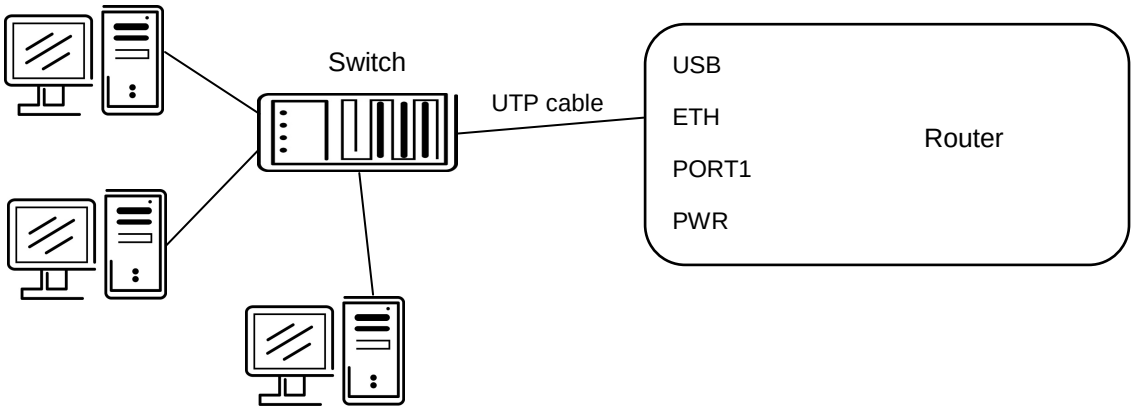
2.8.8. Connection of the ETH Connector

Panel socket RJ45.

Pin number	Signal mark	Description	Data flow direction
1	TXD+	Transmit Data – positive pole	Input/Output
2	TXD-	Transmit Data – negative pole	Input/Output
3	RXD+	Receive Data – positive pole	Input/Output
4	---	---	
5	---	---	
6	RXD-	Receive Data – negative pole	Input/Output
7	---	---	
8	---	---	

ATTENTION! Port ETH is not POE (Power Over Ethernet) compatible!

The ETH router connection:

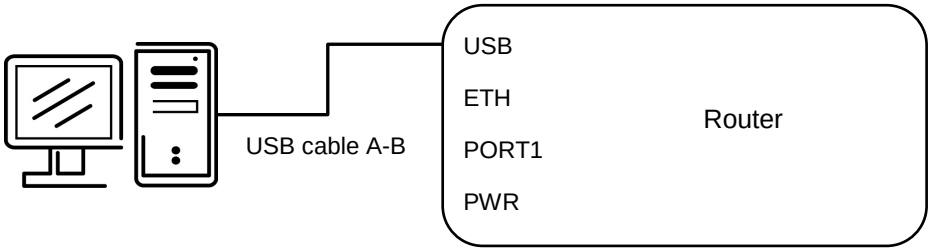


2.8.9. Connection of the Connector USB

Panel socket USB-A.

Pin number	Signal mark	Description	Data flow direction
1	VCC	Positive pole of 5V DC supply voltage	
2	USB data -	USB data signal – negative pole	Input/Output
3	USB data +	USB data signal – positive pole	Input/Output
4	GND	Negative pole of DC supply voltage	

The USB router connection:



2.9. *Technical specification of optional PORT1 and PORT2*

- Expansion port RS232

Expansion port RS232		
Power supply	Internal	....
Environment	Operating temperature	-30 .. +60 ℃
	Storage temperature	-30 .. +85 ℃
Standards	Emission	EN 55022/B
	Immunity	ETS 300 342
	Safety	EN 60950
RS232 specifications (EN 1434)	Max. operating bus current	15 mA
	Max. bit rate	230400 bps
	Max. overvoltage	±30 V
	Max. total cable length (300Bd, 200nF/km)	20 m

LED port indicator	
Green LED	Indicates Receive data
Yellow LED	Indicates Transmit data

- Expansion port RS485-RS422

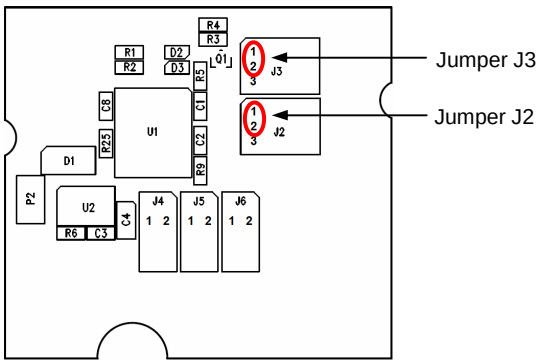
Expansion port RS485-RS422		RS485	RS422
Power supply	External	+10 .. +30 V	
	Internal	....	
	Supply power	Max. 1 W	
	Supply current	Max. 4 mA	
Environment	Operating temperature	-30 .. +60 ℃	
	Storage temperature	-30 .. +85 ℃	
Standards	Emission	EN 55022/B	
	Immunity	ETS 300 342	
	Safety	EN 60950	
RS485 specifications (EN 1434)	Max. devices (each 1,5 mA)	256	
	Max. bit rate	38400 bps	
	Short circuit strength	Permanent	
	Max. total cable length (300Bd, 200nF/km)	1200 m	

LED port indicator	
Green LED	Indicates Receive data
Yellow LED	Indicates Transmit data

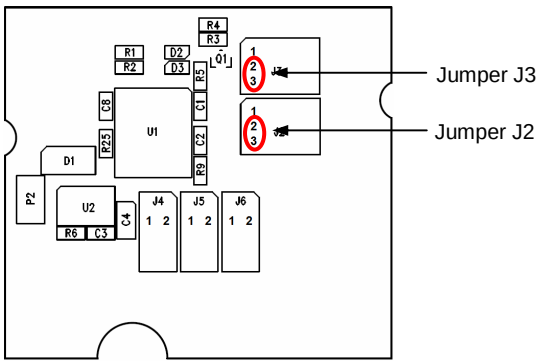
External or internal power supply of module Expansion port RS485/RS422 can be made by wiring jumpers J2 and J3 on this module. If external power supply of the module is required, jumpers J2 and J3 must be connected to pins 2 - 3. Internal power supply is made by connecting pins 1 - 2 with jumpers J2 and J3.

Interface behaviour of module Expansion port RS485/RS422 can be made by wiring jumpers J4, J5 and J6 on this module. If RS485 is required, jumpers J4 and J5 must be connected and jumper J6 disconnected. If RS422 is required, jumpers J4 and J5 must be disconnected and jumper J6 connected.

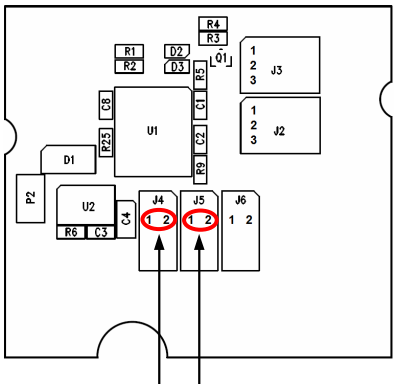
Jumper placement can be seen in the picture below (module Expansion port RS485/RS422 from TOP layer). We recommend that internal power supply is only chosen in the event that it is not possible to ensure external power supply. If internal power supply is chosen, converter RS485/RS422 is not galvanic separated.



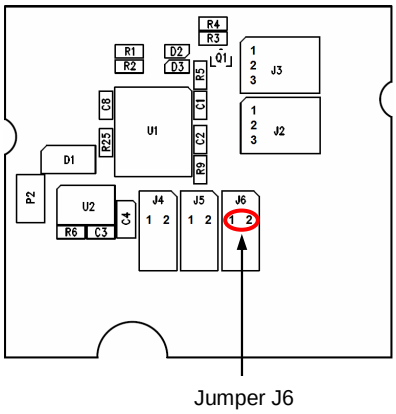
The jumper circuitry for internal supply



The jumper circuitry for external supply



The jumper circuitry for RS485



The jumper circuitry for RS422

- Expansion port ETHERNET

Expansion port ETH		
Power supply	Internal	....
Environment	Operating temperature	-30 .. +60 ℃
	Storage temperature	-30 .. +85 ℃
Standards	Emission	EN 55022/B
	Immunity	ETS 300 342
	Safety	EN 60950
Ethernet (IEEE 802.3)	Max. bit rate	100 Mbps
	Max. total cable length (300Bd, 200nF/km)	100 m

LED port indicator	
Green LED	On ..... selected 100 Mbit/s Off ..... selected 10 Mbit/s
Yellow LED	On..... the network cable is connected Blinking …….... data transmission Off ..... the network cable is not connected

- Expansion port M-BUSD

Expansion port M-BUSD		
Power supply	Voltage	+10 .. +30 V
	Supply power	Max. 4 W
Environment	Operating temperature	-30 .. +60 ℃
	Storage temperature	-30 .. +85 ℃
Standards	Emission	EN 55022/B
	Immunity	ETS 300 342
	Safety	EN 60950
M-BUS specifications (EN 1434)	Max. devices (each 1,5 mA)	30
	Max. operating bus current	60 mA
	Overload detection	100 mA
	Short circuit strength	Permanent
	Bus voltage mark	36 .. 43 V
	Bus voltage space	24 .. 31 V
	Max. total cable length (300Bd, 200nF/km)	1000 m

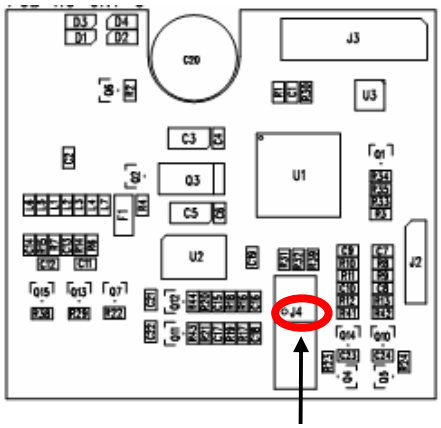
LED port indicator	
Green LED	Indicates Receive data
Yellow LED	Indicates Transmit data
Both LED lights	Indicates short circuit on the MBUS

- Expansion port CNT

Expansion port CNT		
Power supply	Internal	….
	Sleep	100 µA (counter is functional)
	Operation	2 mA
Environment	Operating temperature	-30 .. +60 ℃
	Storage temperature	-30 .. +85 ℃
Standards	Emission	EN 55022/B
	Immunity	ETS 300 342
	Safety	EN 60950
	Isolation	EN 60747
Inputs/Outputs	2x counter	Max. 100 Hz, ratio max. 1:10
	2x analogue inputs	0 .. 20 mA, R_{in} 100 Ohms
	2x binary inputs	reed contact with J4 – 20mA without J4 8µA
	1x output (open collector)	30V/100 mA
Others	Voltage resistance	Permanent
	Sleeping mode	Controlled

LED port indicator	
Green LED	Indicates Binary input Bin0
Yellow LED	Indicates Binary input Bin1

If active level is set as log. 1, electric current can be selected with jumper. When jumper J4(viz. picture) is mounted on pins, electric current value is 20 mA. When jumper J4 is not mounted, electric value is 8µA. If current value is 20mA, CNT has higher consumption, also it has higher resistance to industrial noise.



Jumper J4

2.10. *Technical specification of Binary input and output*

Port IO		
Input/Output	Binary input	reed contact with trigger level 1,3 up to 1,4 V
	Binary output	120 mA/max. 30 V

2.11. Modem status indication

On the front and back panel of the modem there are altogether eight LED indicators, which inform on the modem status. On every port are two LED indicators, which inform port status.

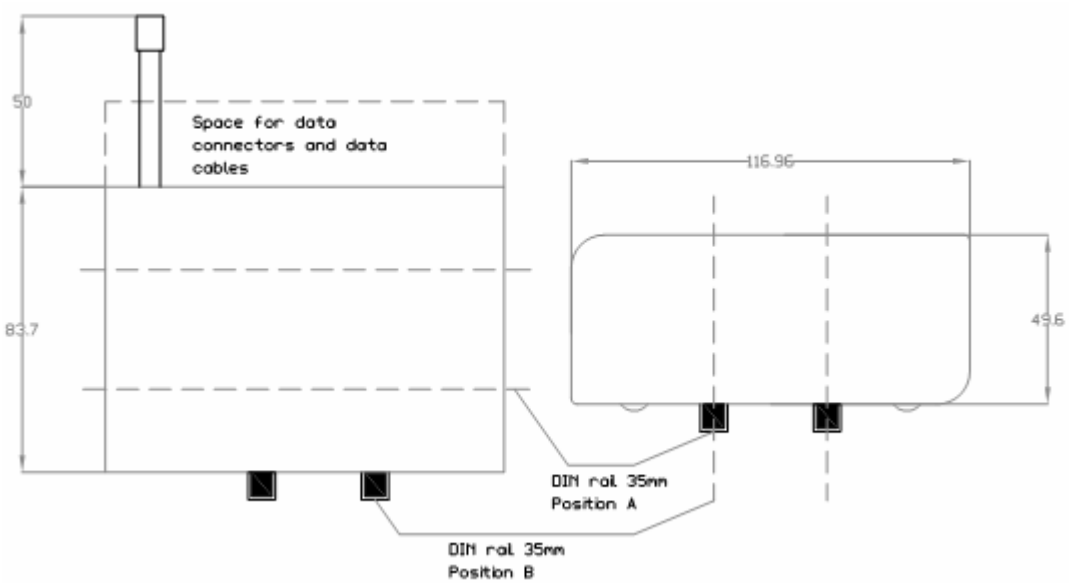
Panel	Color	Description	Description
Front	Green	PWR	Blinking ..... router is ready Permanently on …….starting of the router
Front	Red	GSM	Blinking …….. communication in progress
Front	Yellow	PPP	On.....join PPP connection
Front	Yellow	USR	Function selected by user
Front	Green	OUT	On.....Binary output active
Front	Green	IN	On..... Binary input active
Front	Green	ETH	On ..... selected 100 Mbit/s Off ..... selected 10 Mbit/s
Front	Yellow	ETH	On..... the network cable is connected Blinking …….. data transmission Off ..... the network cable is not connected
Front	Green	PORT	Description by port (viz. Technical specification)
Front	Yellow	PORT	Description by port (viz. Technical specification)
Front	Yellow	SIM1	On.....SIM card 1 is active
Front	Yellow	SIM2	On.....SIM card 2 is active

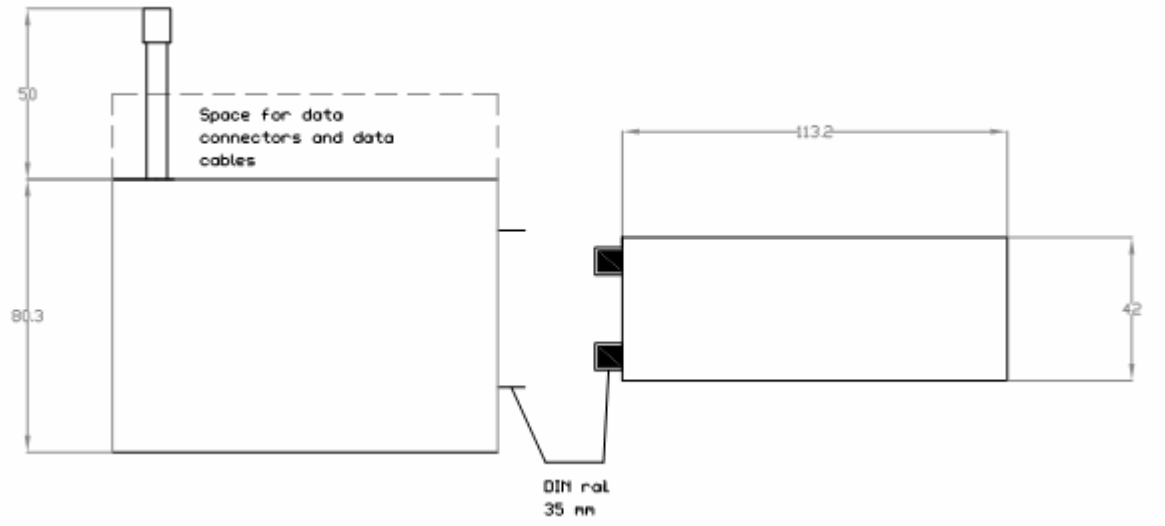
2.12. *Putting into operation*

Before putting the ER75i v2 or ER75i v2 SL router into operation it is necessary to connect all components needed for the operation of your applications and the SIM card must be inserted (the modem is off).

The modem is put into operation by connection of the power supply to the modem. In the default setting the modem starts to login automatically to the preset APN. The behavior of the modem can be modified by means of the web interface which is described in the following chapter.

2.13. *Mechanical external dimensions and mounting recommendations*





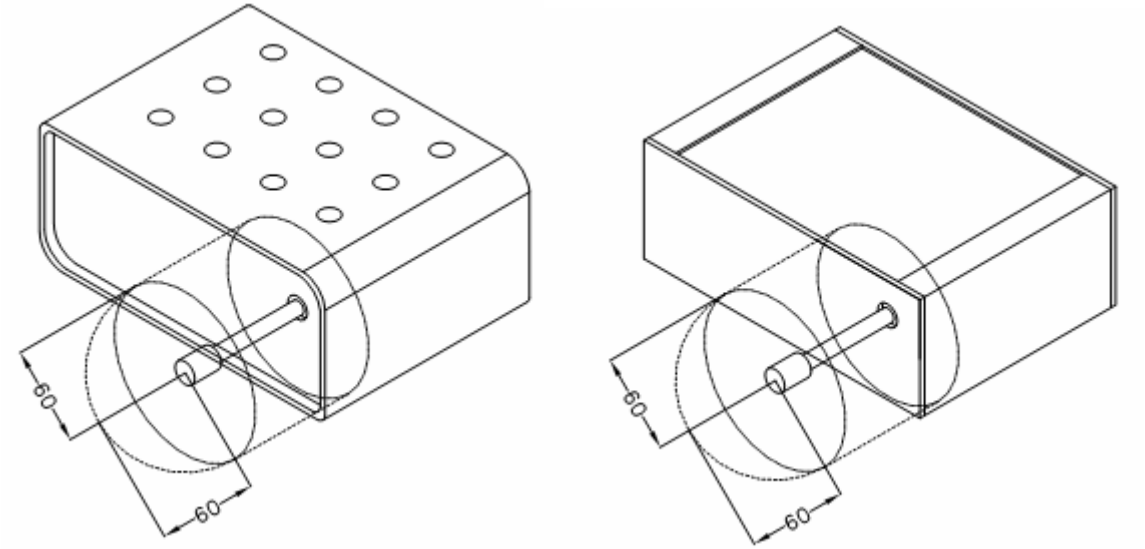
For the majority of applications with a built-in modem in a switch board it is possible to recognize two sorts of environments:

- no public and industry environment of low voltage with high interference,
- public environment of low voltage without high interference.

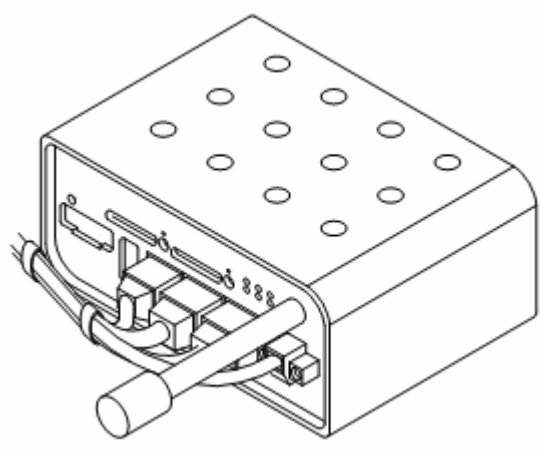
For both of these environments it is possible to mount modems to a switch board, the following there is no need to have examination immunity or issues in connection with EMC according to EN 60439-1 ed.2:00 + A1:04.

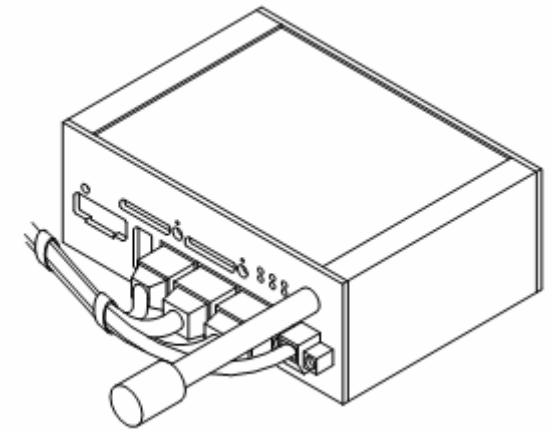
For compliance of EN 60439-1 ed.2:00 + A1:04 specification it is necessary to observe next assembly of the modem to the switch - board:

- for round antennas we recommend to observe a distance of 6 cm from cables and metal surfaces on every side according to the next picture due to the elimination of interference, while using an external antenna except for the switch-board it is necessary to fit a lightening conductor,
- before mounting a modem on sheet-steel we recommend using an external antenna,

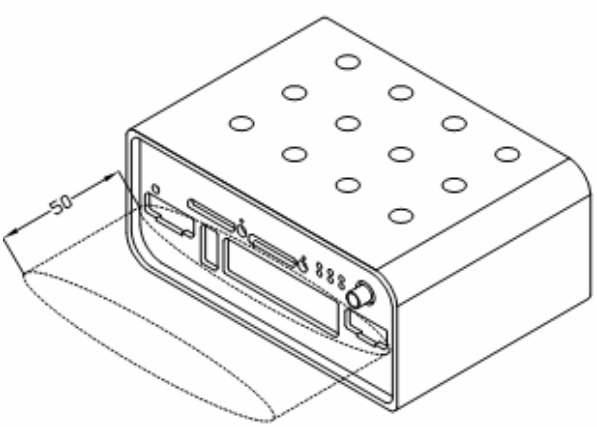


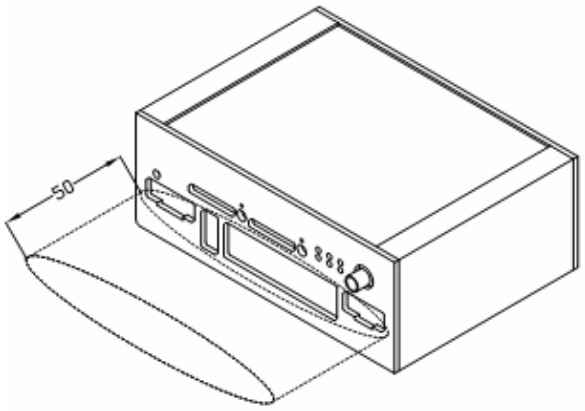
- for single cables we recommend to bind the bunch according to the following picture, for this use we recommend:
  - length of the bunch (combination of power supply and data cables) can be maximum 1,5 m, if the length of data cables exceeds 1,5 m or in the event of, the cable leads towards the switch - board, we recommend installing over - voltage protectors (surge suppressors),
  - with data cables they mustn't carry cables with reticular tension ~ 230 V/50 Hz,
  - all signals to sensors must be twisted pairs.





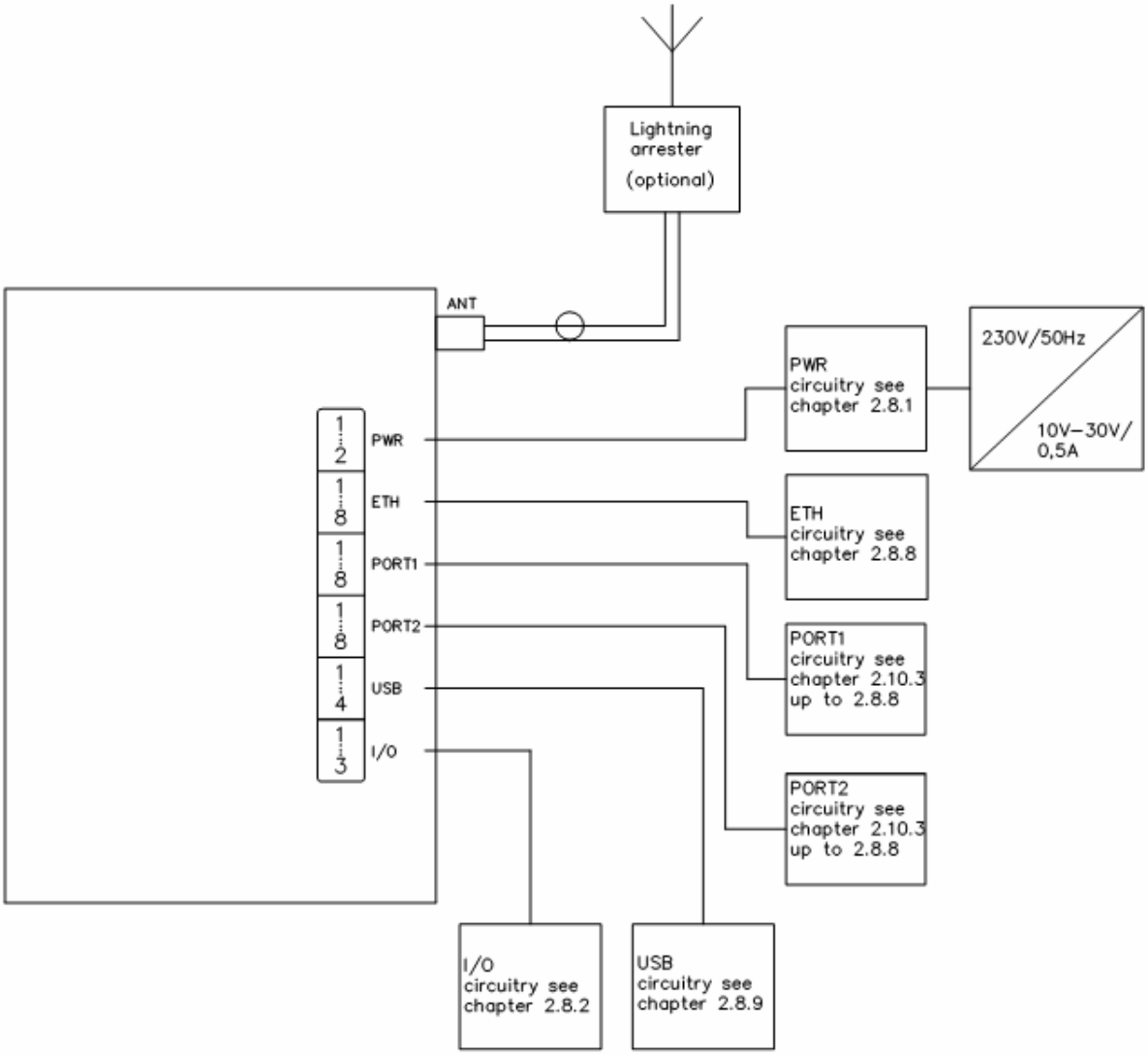
- sufficient space must be left before individual connectors for handling of cables,





- for correct function of the modem we recommend to use in the switch-board earth-bonding distribution frame for grounding of power supply of modem, data cables and antenna,

- the circuit diagram of the modem is on the following pictures.

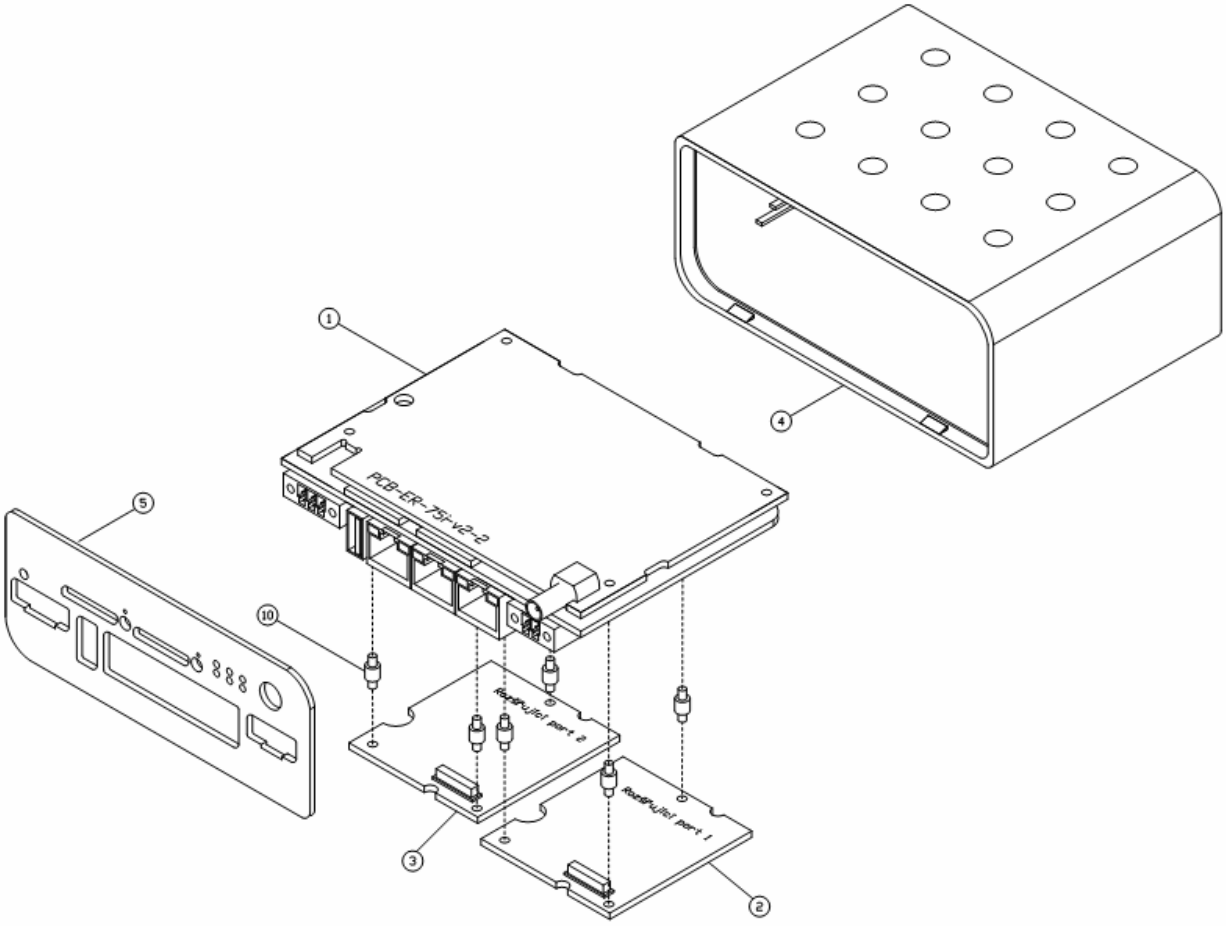


3. Expansion port mounting

3.1. *Expansion port mounting for ER75i v2*

Attention! Expansion port PORT1 and PORT2 include when the router ER75i v2 SL is switched off.

After removing front head of the box it is possible to take out the B-RB-v2 motherboard (position 1). The expansion port PORT1 (position 2) is connected to connector J8 (see below) of the router B-RB-v2 motherboard (position 1) from TOP side. The expansion port PORT2 (position 3) is connected to connector J3 (see below) of the router B-RB-v2 motherboard (position 1) from TOP side. The expansion port is mounted to the motherboard by the help of three spacers (position 10). After mounting the expansion port the box is inserted motherboard into box and kneaded front head in the box.



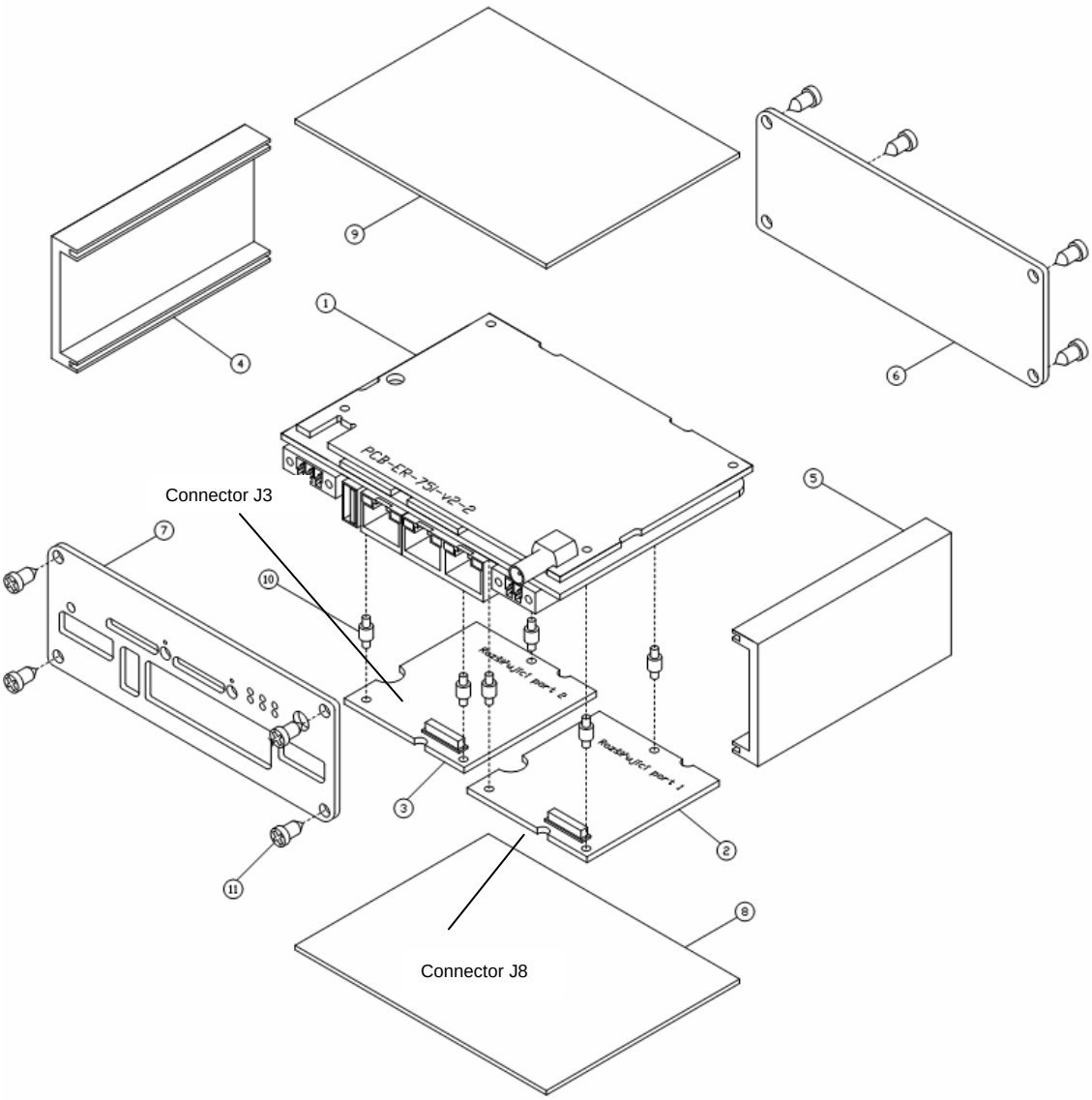
Parts list and description

Part	Description	Number
1	UMTS router motherboard	1
2	Expansion port PORT1	1
3	Expansion port PORT2	1
4	Box	1
5	Front head	1
6	Spacers for expansion port PORT1 mounting to motherboard	6

3.2. *Expansion port mounting for ER75i v2 SL*

Attention! Expansion port PORT1 and PORT2 include when the router ER75i v2 SL is switched off.

After unscrewing four screws (position 11) on the rear panel (position 6) and removing it is possible to take out the B-RB-v2 motherboard (position 1). The expansion port PORT1 (position 2) is connected to connector J8 (see below) of the router B-RB-v2 motherboard (position 1) from TOP side. The expansion port PORT2 (position 3) is connected to connector J3 (see below) of the router B-RB-v2 motherboard (position 1) from TOP side. The expansion port is mounted to the motherboard by the help of three spacers (position 10). After mounting the expansion port the box is screwed together by the help of four screws(position 11).



Parts list and description

Part	Description	Number
1	EDGE router motherboard	1
2	Expansion port PORT1	1
3	Expansion port PORT2	1
4	Left box part	1
5	Right box part	1
6	Rear head	1
7	Front head	1
8	Bottom box part	1
9	Top box part	1
10	Spacers for expansion port PORT1 mounting to motherboard	6
11	Screw for box completion	8

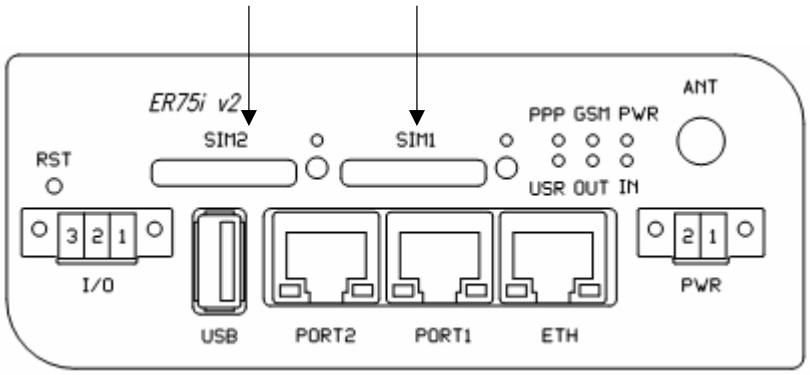
4. Changing the SIM cards

Attention! Insert the SIM card when the router is switched off.

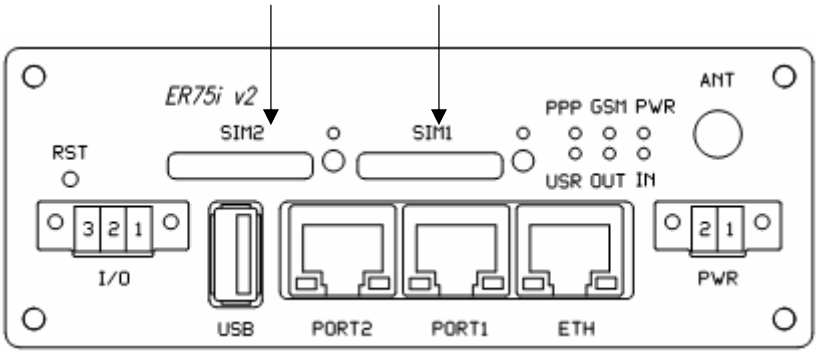
Changing the first SIM card:

Ensure that the modem is disconnected from the power supply. Press the small yellow button next to the reader to eject the reader holder. Insert the SIM card into the reader holder and slide it in the reader. Second SIM card SIM2 changes, as well as SIM1.

SIM card 2 SIM card 1



SIM card 2 SIM card 1



5. Ordering code routers

5.1. *Basic version*

Basic version includes one Ethernet port, one USB – Host interface, one SIM card reader, one I/O interface and one optional port:

Optional port	Ordering code
Version without optional port	ER75i v2B set
Version with optional Ethernet port	ER75i v2B set ETH
Version with optional RS232 port	ER75i v2B set RS232
Version with optional RS485 port	ER75i v2B set RS458
Version with optional MBUS port	ER75i v2B set MBUS
Version with optional CNT port	ER75i v2B set CNT

5.2. *Full version*

Full version includes one Ethernet port, one USB – Host interface, two SIM card readers, one I/O interface and one optional port:

Optional port	Possible participation	Ordering code
Version without optional port		ER75i v2F set
Version with optional Ethernet port	PORT1	ER75i v2F set ETH
Version with optional RS232 port	PORT1 a PORT2	ER75i v2F set RS232
Version with optional RS485 port	PORT1 a PORT2	ER75i v2F set RS458
Version with optional MBUS port	PORT1 a PORT2	ER75i v2F set MBUS
Version with optional CNT port	PORT1	ER75i v2F set CNT

Second optional port is written after first optional port in the ordering code.

Example:

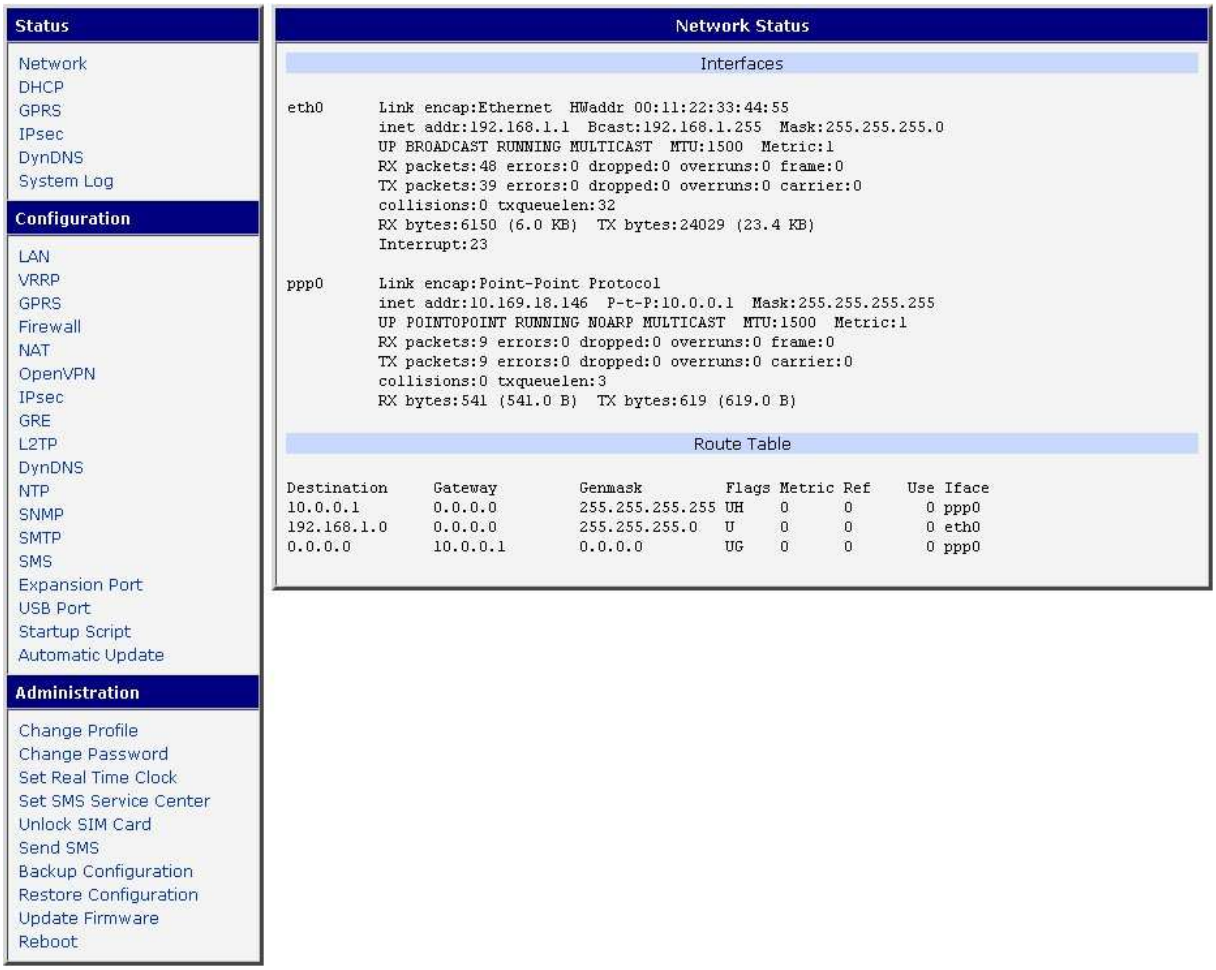
- Full version with ethernet and RS232 port: ER75i v2F set ETH RS232.
- Full version with ethernet and RS232 port in Metallic cover: ER75i v2F SL set ETH RS232.

6. Configuration setting over web browser

Attention! If the SIM card is not inserted in the router, then it is impossible to operate. The inserted SIM card must have activated GPRS. Insert the SIM card when the router is switched-off.

Monitoring of the status, configuration and administration of the router can be performed by means of the web interface, which is available after insertion of IP address of the modem into the web browser. The default IP address of the modem is 192.168.1.1. Configuration may be performed only by the user "root" with initial password "root".

The left part of the web interface contains the menu with pages for monitoring of the Status, Configuration and Administration of the router.



After green LED starts to blink it is possible to restore initial settings of the router by pressing button RST on front panel. After press button RST it is restoration of the configuration and reset (green LED will be on).

6.1. *Network Status*

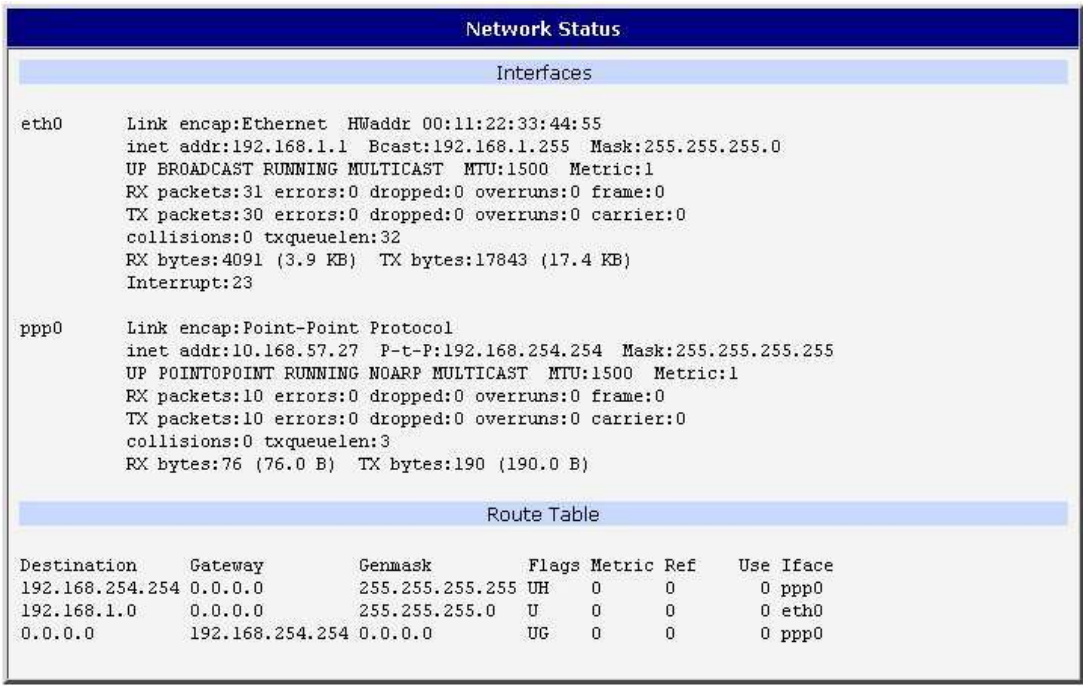
To view the system information about the modem operation, select the *System Information* menu item. The bottom part of the window contains information about the system memory usage. The upper part of the window displays detailed information about active interfaces:

- eth0 – parameters of networks interface
- ppp0 – PPP interface (active connection to GPRS/EDGE)
- tun0 – OpenVPN tunnel interface
- gre1 – GRE tunnel interface
- ipsec0 – IPSec tunnel interface

By each of the interfaces is then shown the following information:

- HWaddr – hardware (unique) address of networks interface
- inet – own IP address
- P-t-P – IP address second ends connection
- Bcast – broadcast address
- Mask – mask of network
- MTU – maximum size of packet, which is equipment able transmit
- Metric – number of routers, over which packet must pass
- RX packets – received packets, errors – number of errors, dropped – dropped packets
- TX packets – transmit packets, errors – number of errors, dropped – dropped packets
- collisions – number of collisions
- RX bytes – total number of received bytes
- TX bytes – total number of transmitted bytes

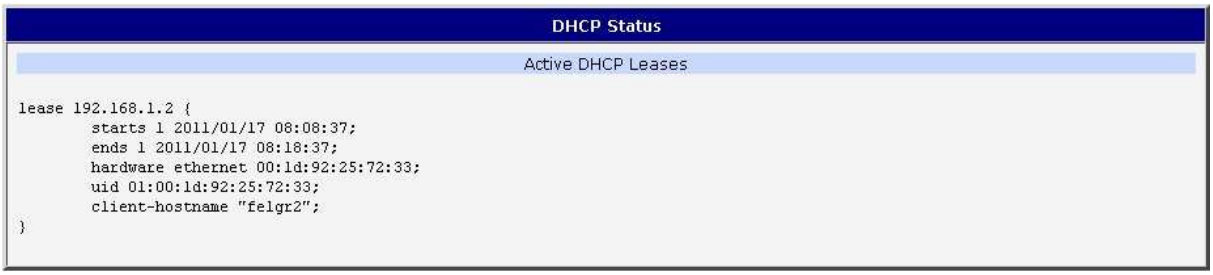
It is possible to elicit PPP connection state from the network information. If the PPP connection is active, then it is in the system information shown as ppp0 connection.


Network Status
Interfaces
eth0 Link encap:Ethernet HWaddr 00:11:22:33:44:55
inet addr:192.168.1.1 Bcast:192.168.1.255 Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:31 errors:0 dropped:0 overruns:0 frame:0
TX packets:30 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:32
RX bytes:4091 (3.9 KB) TX bytes:17843 (17.4 KB)
Interrupt:23
ppp0 Link encap:Point-Point Protocol
inet addr:10.168.57.27 P-t-P:192.168.254.254 Mask:255.255.255.255
UP POINTOPOINT RUNNING NOARP MULTICAST MTU:1500 Metric:1
RX packets:10 errors:0 dropped:0 overruns:0 frame:0
TX packets:10 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:3
RX bytes:76 (76.0 B) TX bytes:190 (190.0 B)
Route Table
Destination Gateway Genmask Flags Metric Ref Use Iface
192.168.254.254 0.0.0.0 255.255.255.255 UH 0 0 0 ppp0
192.168.1.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
0.0.0.0 192.168.254.254 0.0.0.0 UG 0 0 0 ppp0

6.2. *DHCP Status*

Information about IP addresses, which was leased to the router by the DHCP server, is possible to find in menu in sum *DHCP:*

- lease 192.168.1.2 (generally IP address) – assigned IP address
- starts – information about time of assignation of IP address
- ends – information about time of termination IP address validity
- hardware ethernet – hardware MAC (unique) address
- uid – unique ID
- client-hostname – computer name



In the extreme the DHCP status can display two records for one IP address. That could have been caused by resetting of network cards.

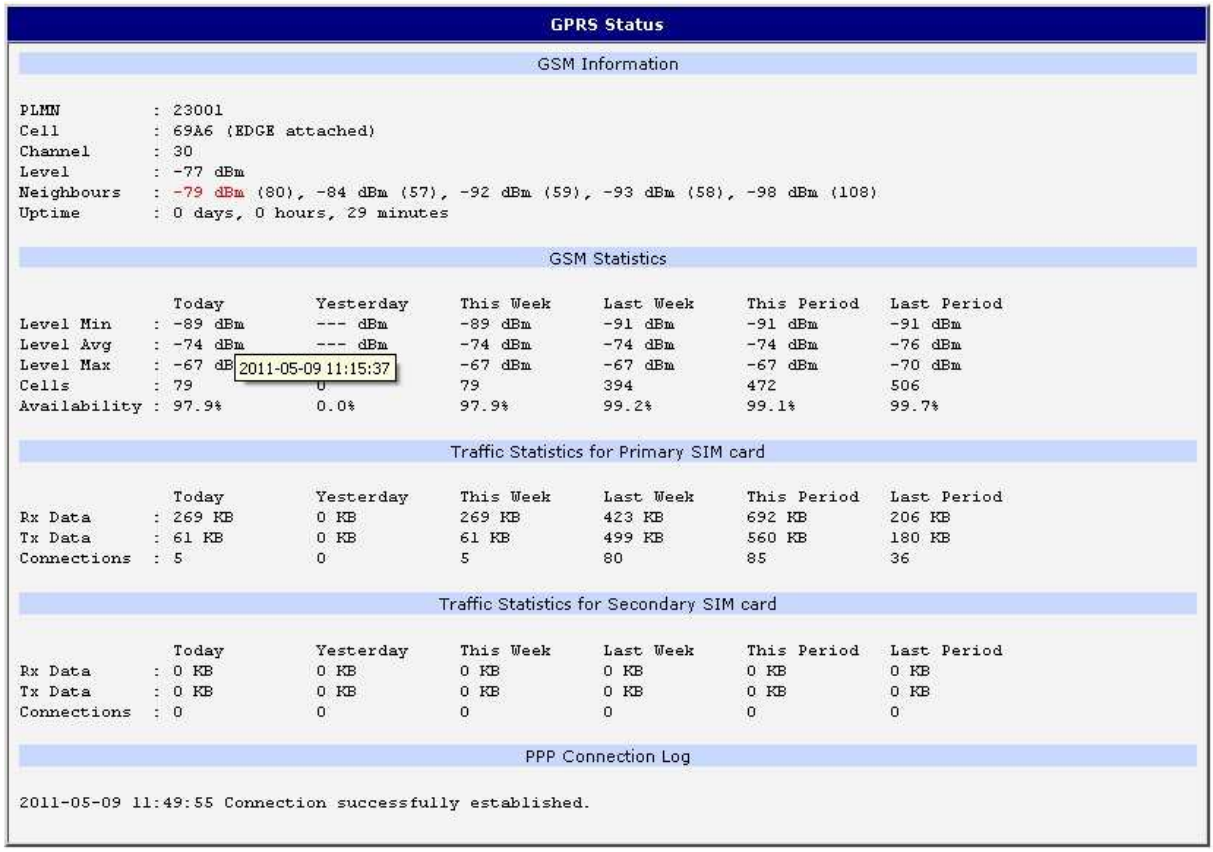
6.3. *GPRS Status*

The item *GPRS* in the menu contains up-to-date information about PLMN (code of operator), cell, channel and signal quality of the selected cell, as well as neighboring hearing cells and Uptime (time to establish PPP conection).

In the next part of window is show information about GSM connect in different period. This and last day in period from 0:00 to 23:59, this and last week in period from Monday 0:00 to Sunday 23:59, this and last accounting period. Router is show minimal signal strength (Level Min), average signal strength (Level Avr), maximal signal strength (Level Max), number of cells, that will replace the modem (Cells) and availability PPP connect, which is calculated us ration of PPP connect time and router power on time. After you place your cursor on the maximum or minimum signal strength will show the last time when the signal strength reaching the router.

In the middle part of window is shows information about transferred data and number of connection both SIM card in period us in GSM statistic.

The PPP Connection Log is in the bottom of this window where information about the make-up of the PPP connection is and pertinent problems on this formation.



GPRS Status

GSM Information

```
PLMN          : 23001
Cell          : 69A6 (EDGE attached)
Channel       : 30
Level         : -77 dBm
Neighbours    : -79 dBm (80), -84 dBm (57), -92 dBm (59), -93 dBm (58), -98 dBm (108)
Uptime        : 0 days, 0 hours, 29 minutes
```

GSM Statistics

	Today	Yesterday	This Week	Last Week	This Period	Last Period
Level Min	-89 dBm	--- dBm	-89 dBm	-91 dBm	-91 dBm	-91 dBm
Level Avg	-74 dBm	--- dBm	-74 dBm	-74 dBm	-74 dBm	-76 dBm
Level Max	-67 dB	2011-05-09 11:15:37	-67 dBm	-67 dBm	-67 dBm	-70 dBm
Cells	79	0	79	394	472	506
Availability	97.9%	0.0%	97.9%	99.2%	99.1%	99.7%

Traffic Statistics for Primary SIM card

	Today	Yesterday	This Week	Last Week	This Period	Last Period
Rx Data	269 KB	0 KB	269 KB	423 KB	692 KB	206 KB
Tx Data	61 KB	0 KB	61 KB	499 KB	560 KB	180 KB
Connections	5	0	5	80	85	36

Traffic Statistics for Secondary SIM card

	Today	Yesterday	This Week	Last Week	This Period	Last Period
Rx Data	0 KB	0 KB	0 KB	0 KB	0 KB	0 KB
Tx Data	0 KB	0 KB	0 KB	0 KB	0 KB	0 KB
Connections	0	0	0	0	0	0

PPP Connection Log

```
2011-05-09 11:49:55 Connection successfully established.
```

6.4. *IPsec status*

Information on actual IPsec tunnel state can be called up in option *IPsec* in the menu. Detailed information on the description shown below can be found on the following link http://www.freeswan.org/doc.html.

IPsec Status

IPsec Tunnel Informations

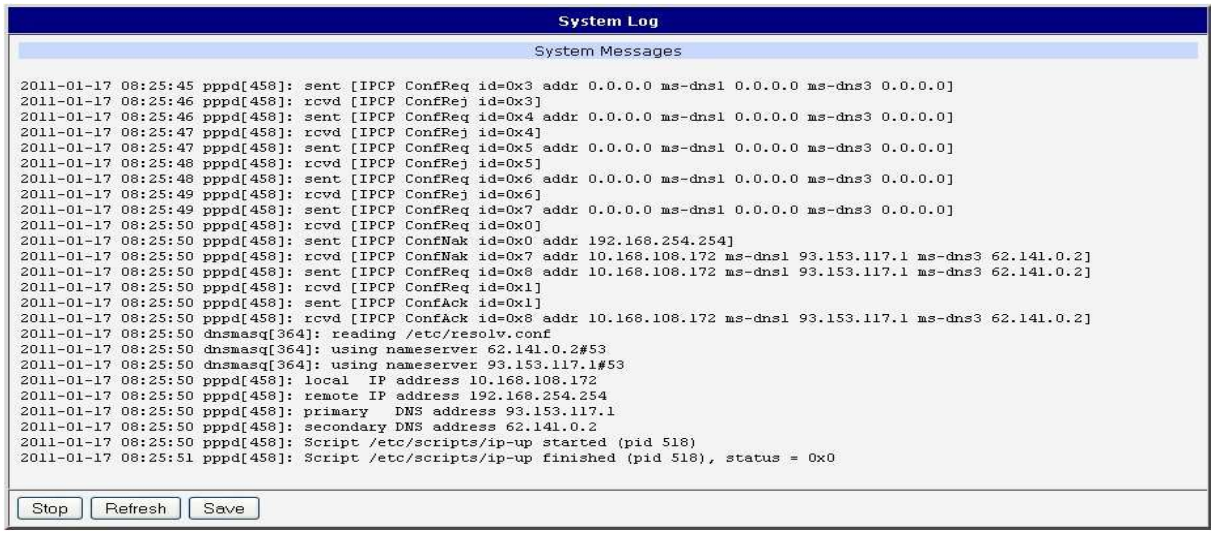
```
interface eth0/eth0 192.168.1.1
interface ppp0/ppp0 10.169.62.129
%myid = (none)
debug none

"ipsec1": 192.168.1.0/24===10.169.62.129...10.0.0.2===192.168.2.0/24; unrouted; eroute owner: #0
"ipsec1":     myip=unset; hisip=unset; myup=/etc/scripts/updown; hisup=/etc/scripts/updown;
"ipsec1":   ike_life: 3600s; ipsec_life: 3600s; rekey_margin: 540s; rekey_fuzz: 100%; keyingtries: 0
"ipsec1":   policy: PSK+ENCRYPT+TUNNEL+UP; prio: 24,24; interface: ppp0;
"ipsec1":   newest ISAKMP SA: #0; newest IPsec SA: #0;

#1: "ipsec1":500 STATE_MAIN_I1 (sent MI1, expecting MR1); EVENT_RETRANSMIT in 5s; nodpd; idle; import:admin initiate
#1: pending Phase 2 for "ipsec1" replacing #0
```

6.5. *DynDNS status*

DynDNS up - dating entry result on server www.dyndns.org can be called up in option DynDNS item in the menu.

6.6. *System Log*

In case of any problems with connection to GPRS it is possible to view the system log by pressing the *System Log* menu item. The System log observes only connection to GPRS and formation of IPsec tunnel. The upper part of the window displays possible errors at GPRS connection establishment. After switching on the log daemon by pressing the *Start* button, the bottom part of the window displays detailed reports from individual applications running in the modem. To update the contents of the window press the *Refresh* button. By the help of button *Save* it is possible to save the system log to the computer.


System Log
System Messages
2011-01-17 08:25:45 pppd[458]: sent [IPCP ConfReq id=0x3 addr 0.0.0.0 ms-dns1 0.0.0.0 ms-dns3 0.0.0.0]
2011-01-17 08:25:46 pppd[458]: rcvd [IPCP ConfRej id=0x3]
2011-01-17 08:25:46 pppd[458]: sent [IPCP ConfReq id=0x4 addr 0.0.0.0 ms-dns1 0.0.0.0 ms-dns3 0.0.0.0]
2011-01-17 08:25:47 pppd[458]: rcvd [IPCP ConfRej id=0x4]
2011-01-17 08:25:47 pppd[458]: sent [IPCP ConfReq id=0x5 addr 0.0.0.0 ms-dns1 0.0.0.0 ms-dns3 0.0.0.0]
2011-01-17 08:25:48 pppd[458]: rcvd [IPCP ConfRej id=0x5]
2011-01-17 08:25:48 pppd[458]: sent [IPCP ConfReq id=0x6 addr 0.0.0.0 ms-dns1 0.0.0.0 ms-dns3 0.0.0.0]
2011-01-17 08:25:49 pppd[458]: rcvd [IPCP ConfRej id=0x6]
2011-01-17 08:25:49 pppd[458]: sent [IPCP ConfReq id=0x7 addr 0.0.0.0 ms-dns1 0.0.0.0 ms-dns3 0.0.0.0]
2011-01-17 08:25:50 pppd[458]: rcvd [IPCP ConfReq id=0x0]
2011-01-17 08:25:50 pppd[458]: sent [IPCP ConfNak id=0x0 addr 192.168.254.254]
2011-01-17 08:25:50 pppd[458]: rcvd [IPCP ConfNak id=0x7 addr 10.168.108.172 ms-dns1 93.153.117.1 ms-dns3 62.141.0.2]
2011-01-17 08:25:50 pppd[458]: sent [IPCP ConfReq id=0x8 addr 10.168.108.172 ms-dns1 93.153.117.1 ms-dns3 62.141.0.2]
2011-01-17 08:25:50 pppd[458]: rcvd [IPCP ConfReq id=0x1]
2011-01-17 08:25:50 pppd[458]: sent [IPCP ConfAck id=0x1]
2011-01-17 08:25:50 pppd[458]: rcvd [IPCP ConfAck id=0x8 addr 10.168.108.172 ms-dns1 93.153.117.1 ms-dns3 62.141.0.2]
2011-01-17 08:25:50 dnsmasq[364]: reading /etc/resolv.conf
2011-01-17 08:25:50 dnsmasq[364]: using nameserver 62.141.0.2#53
2011-01-17 08:25:50 dnsmasq[364]: using nameserver 93.153.117.1#53
2011-01-17 08:25:50 pppd[458]: local IP address 10.168.108.172
2011-01-17 08:25:50 pppd[458]: remote IP address 192.168.254.254
2011-01-17 08:25:50 pppd[458]: primary DNS address 93.153.117.1
2011-01-17 08:25:50 pppd[458]: secondary DNS address 62.141.0.2
2011-01-17 08:25:50 pppd[458]: Script /etc/scripts/ip-up started (pid 518)
2011-01-17 08:25:51 pppd[458]: Script /etc/scripts/ip-up finished (pid 518), status = 0x0
Stop
Refresh
Save

Program syslogd can be started with two options that modifies its behaviour. Option "-S" followed by decimal number set maximal number of lines in one log file. Option "-R" followed by hostname or IP address enable logging to remote syslog daemon. For starting syslogd with these options you could modify script "/etc/init.d/syslog" or add lines "killall syslogd" and "syslogd <options> &" into Startup Script.

6.7. *LAN Configuration*

To enter the network configuration, select the *LAN* menu item. In the first part of the window it is possible to define the network interface IP address (*IP address*), the network mask (*Subnet Mask*) and media type (*Media Type*), in the majority of cases set *Auto-Negotiation*. ETH network set in Primary LAN configuration, expansion ETH PORT set in Secondary LAN configuration.

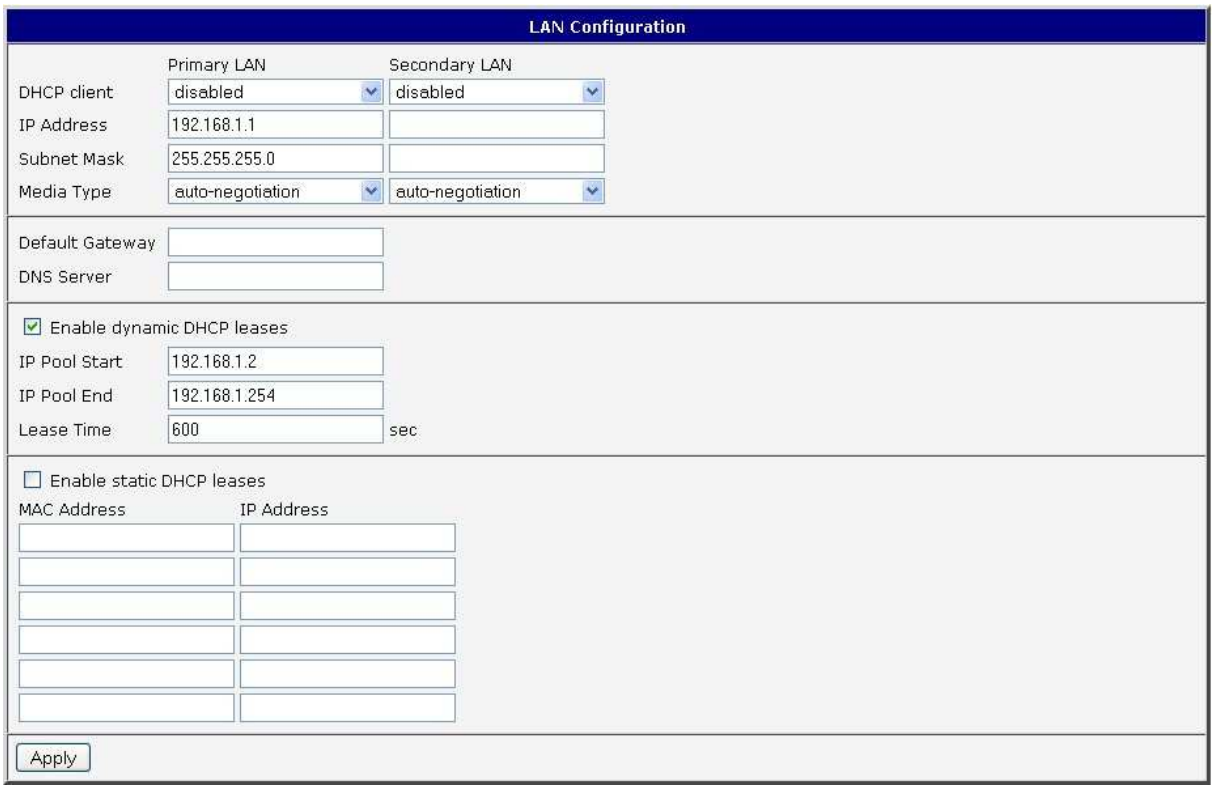
In the second part of the window is possible to define *Default Gateway* and *DNS server*.

In the third part of the window, it is possible to define the DHCP server by checking the *Enable dynamic DHCP server* option. In the window it is possible to define the beginning (*IP Pool Start*) and end (*IP Pool End*) of the pool of IP addresses which will lease to DHCP clients. By parameter *Lease time* is possible to define time after which the client can use IP address.

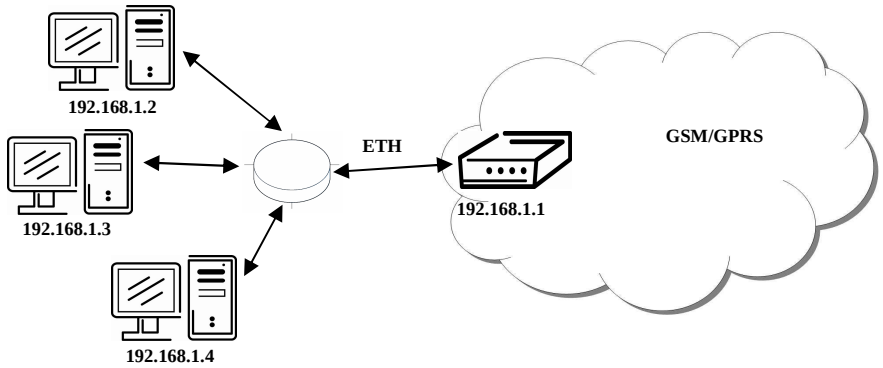
In the fourth part of the Windows it is possible, by checking the *Enable static DHCP server* option, to define leases up to six static *IP Addresses*, which conform to *MAC Address* of the connected equipment etc.

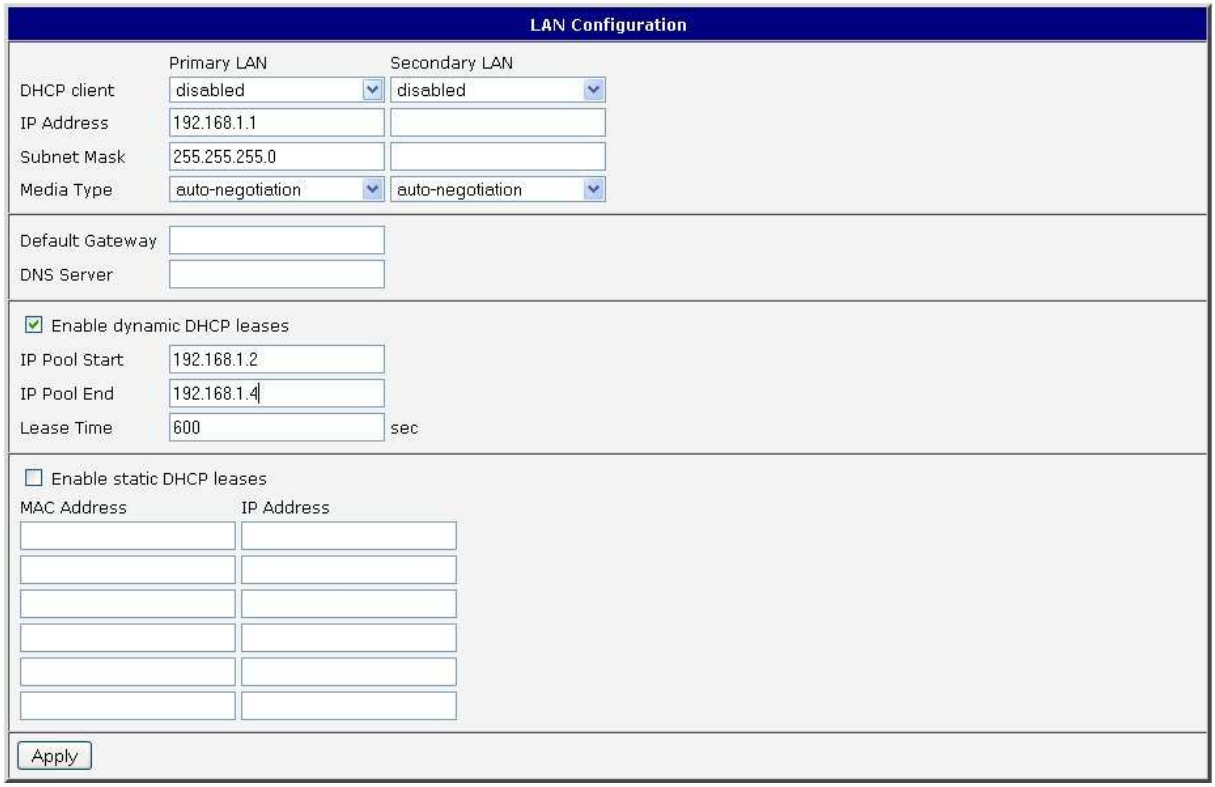
The changes in settings will apply after pressing the *Apply* button.

The DHCP server assign IP addresses to the connected clients from defined address pool, IP address of the gate and IP address of the primary DNS server. It is important not to overlap ranges of static engaged IP address with address allotted by the help of DHCP, or collision of addresses may occur, thereby malfunctioning the network.

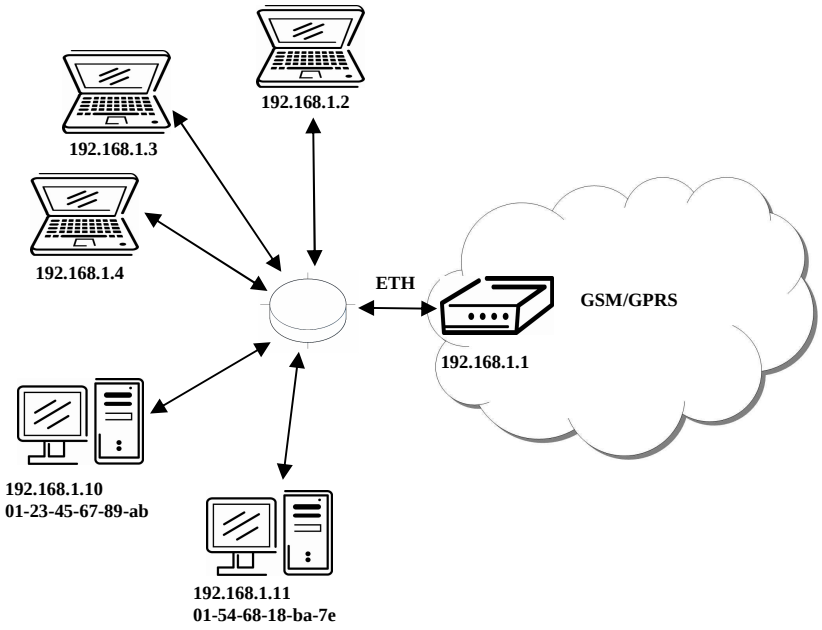


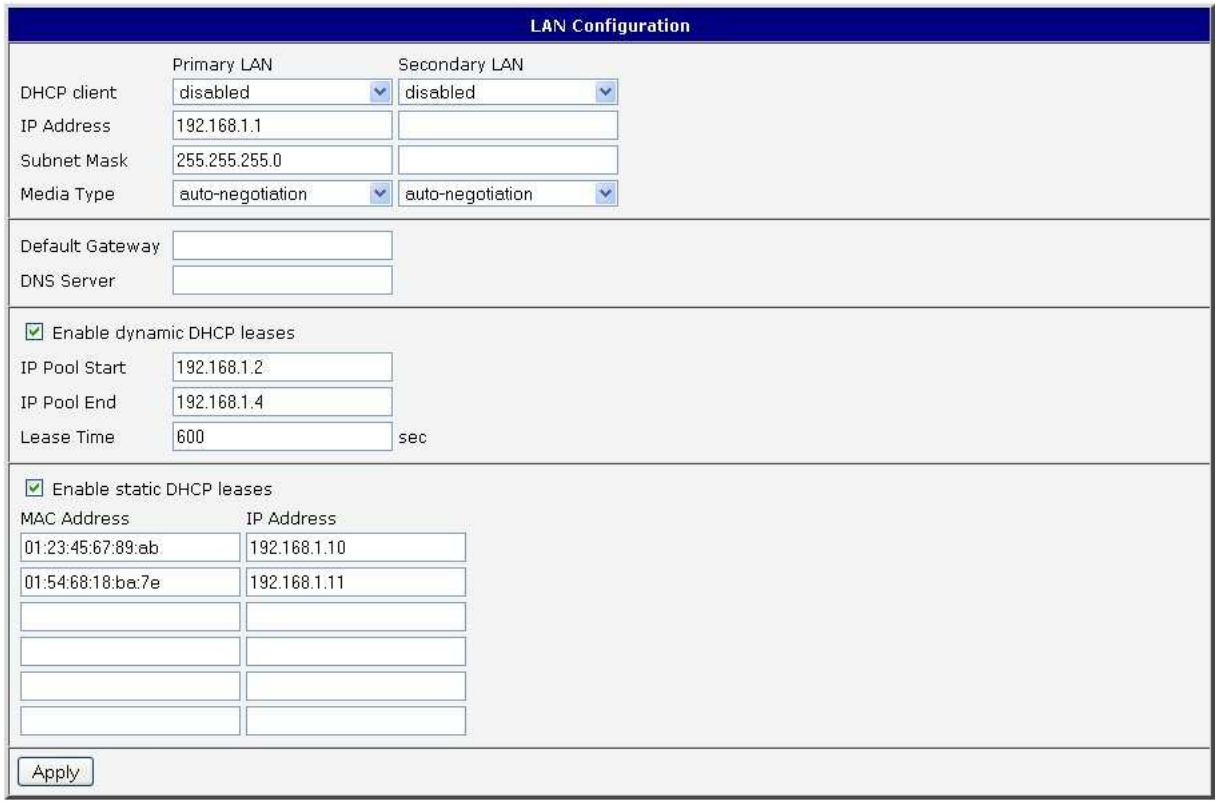
Example of the network interface with dynamic DHCP server:



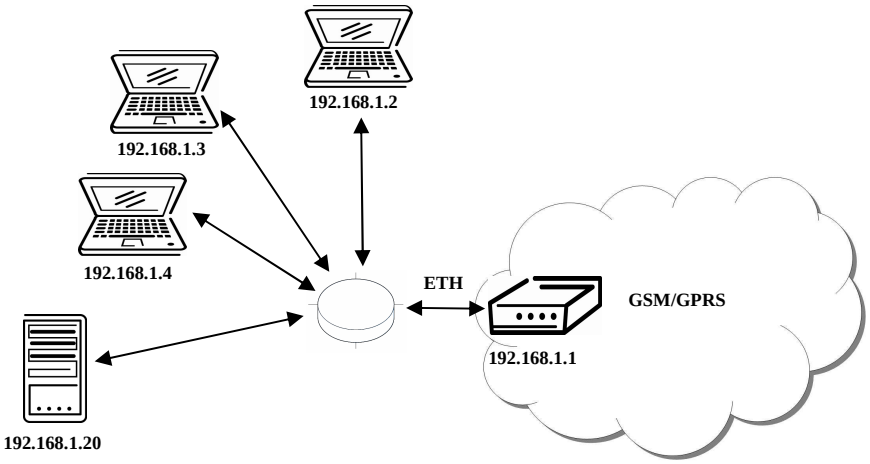


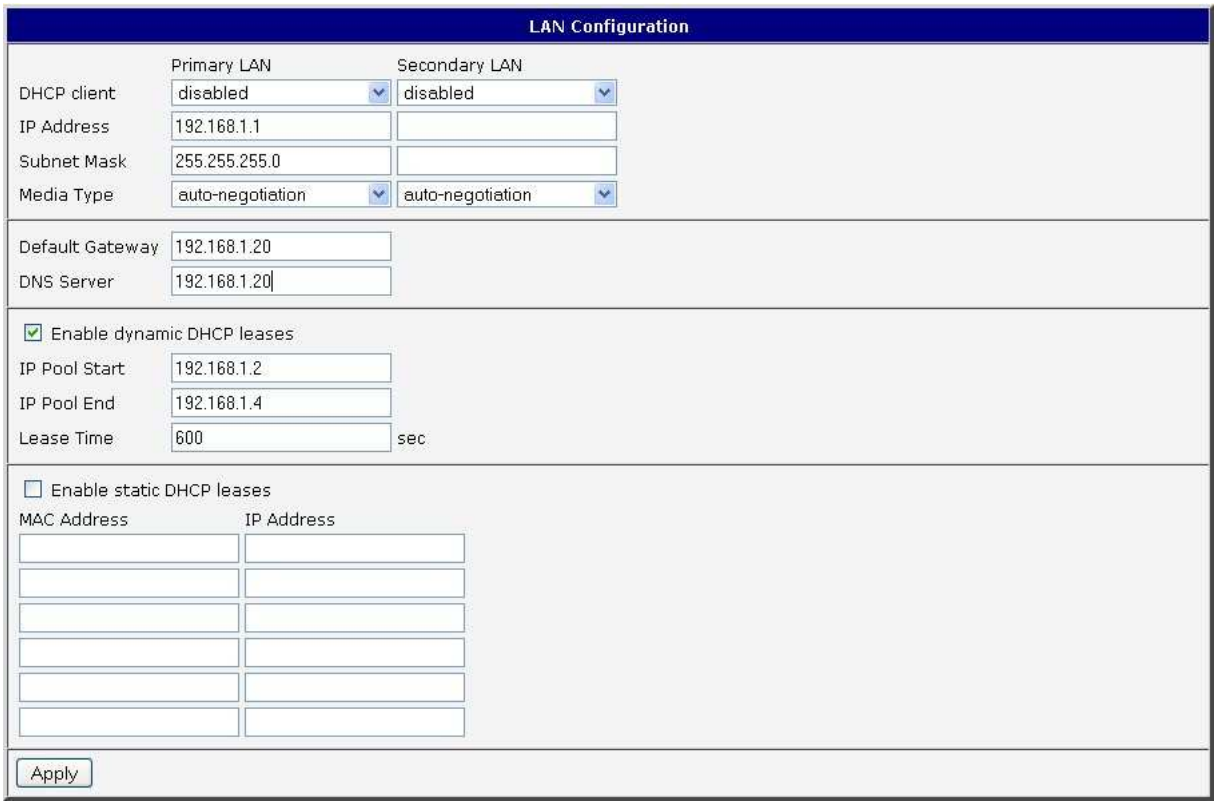
Example of the network interface with dynamic and static DHCP server:





Example of the network interface with default gateway and DNS server:

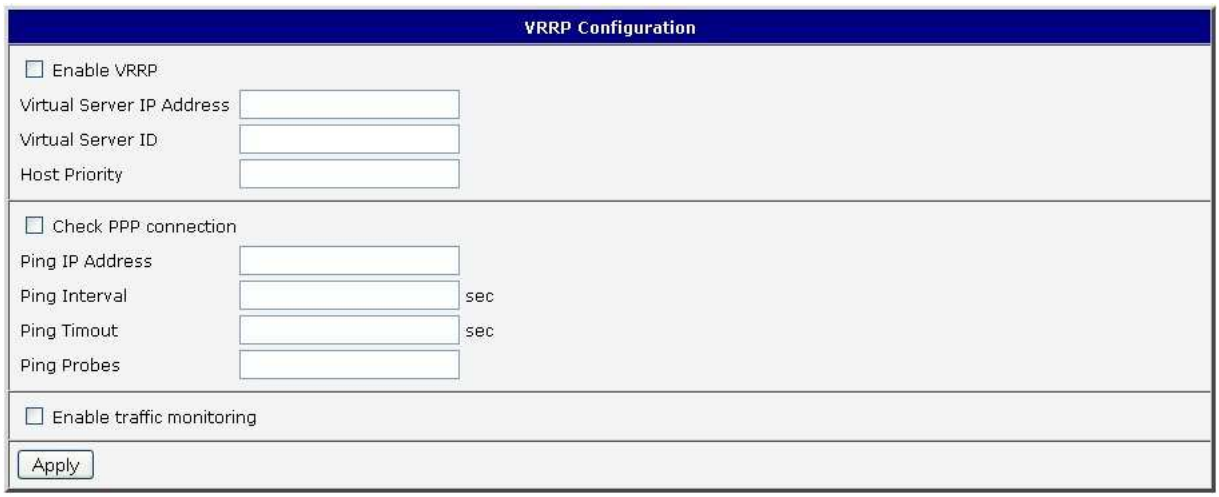




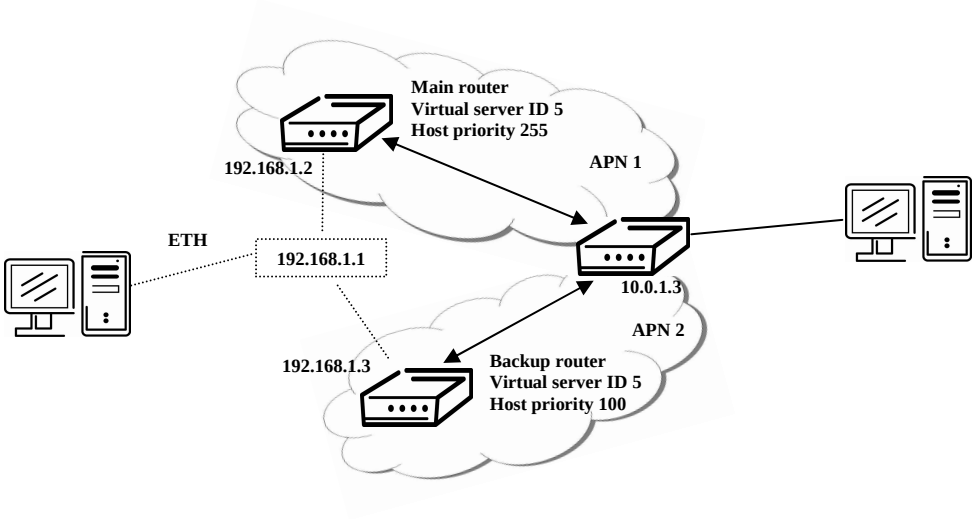
6.8. *VRRP Configuration*

To enter the VRRP configuration select the *VRRP* menu item. VRRP protocol (Virtual Router Redundancy Protocol) is a technique, by which it is possible to forward routing from main router to backup router in the case of the main router failure. If the *Enable VRRP* is checked, then it is possible to set the following parameters. Parameter *Virtual Server IP Address* sets virtual server IP address. This address should be the same for both routers. A connected device sends its data via this virtual address. Parameter *Virtual Server ID* distinguishes one virtual router on the network from others. This implies that the main and backup routers must use the same value for this parameter. The router, with higher priority set by the parameter *Host Priority*, is the main router. According to RFC 2338 the main router has the highest possible priority - 255. The backup router has priority in range 1 – 254 (init value is 100). The priority value equals 0 is not allowed.

It is possible to set *Check PPP connection flag* in the second part of the window. The currently active router (either main or backup) will send testing messages to defined *Ping IP Address* at periodic time intervals (*Ping Interval)* with setting time of waiting for answer (*Ping Timeout)*. The function check PPP connection is used as a supplement of VRRP standard with the same final result. If there are no answers from remote devices (*Ping IP Address*) for a defined number of probes (*Ping Probes),* then connection is switched to the other line. It is possible to use for example a DNS server of mobile operator as a test message (ping) IP address. There's an additional way for evaluating the state of the active line. It is activated by selecting *Enable traffic monitoring* parameter. If this parameter is set and any packet different from ping is sent to the monitored line, then any answer to this packet is expected for *Ping Timeout*. If *Ping Timeout* expires with no answer received then process of testing the active line continues the same way like in the case of standard testing process after first test message answer drops out.



Example of the VRRP protocol:



VRRP Configuration

☑ Enable VRRP		
Virtual Server IP Address	192.168.1.1	
Virtual Server ID	5	
Host Priority	255	
☑ Check PPP connection		
Ping IP Address	10.0.1.3	
Ping Interval	10	sec
Ping Timout	5	sec
Ping Probes	10	
☐ Enable traffic monitoring		

Apply

6.9. *GPRS Configuration*

To enter the GPRS connection configuration select the *GPRS* menu item. If the *Create GPRS connection* option is selected, the modem automatically tries to establish GPRS connection after switching-on. In this window it is possible to define *Username*, *Password*, authentificate protocol in the GSM network (*Authentication*), IP address (*IP Address*) and phone number (*Phone Number*) for two different *APN*. If the *IP address* field is not filled in, the operator automatically assigns the IP address when it is establishing the connection. The router uses phone number *99***1# as default number. When it is set other phone number, it will be use for establish GPRS or CSD connection.

If the *APN* field is not filled in, then the router automatically selects the APN by the IMSI code of the SIM card. If the PLMN (operator number format) is not in the list of APN, then default APN is "internet". The mobile operator defines APN. The PLMN parameter is possible to define in *Operator* item. By parameter *PIN* it is possible to put PIN to the SIM card always during the starting of the router.

Attention! If one SIM card is inserted into the router, which has two different APN's, the router cannot have the second SIM socket mounted. Otherwise it will switch to secondary APN false. Also, correct PIN must be filled. For SIM cards with two APN's there will be the same PIN for both APN`s. Otherwise the SIM card can be blocked by false SIM PIN.

The choice *Get DNS address from operator* is given for easier configuration on client side. If this field is filled in, then the router tries to get an IP address of primary and secondary DNS server from the operator automatically.

If the *Check PPP connection* option is selected, it has active control of connection over PPP. The modem will automatically send the ping question to the selected domain name or IP address (*Ping IP Address*) in periodic time intervals (*Ping Interval*). If the PING failed, new ping be sent immediately. After three unsuccessfully pings on appropriate IP address the router terminates connection and tries to establish a new connection. It is possible to use, for example, the DNS server of a mobile operator as the ping IP address.

If the *Enable Traffic Monitoring* option is selected, then the router stops sending ping questions to the *Ping IP Address* and it will watch traffic in PPP connection. If PPP connection is without traffic longer than the *Ping Interval,* then the router sends ping questions to the Ping IP Address.

Parameter *Data limit* set limit for data sending via GPRS. Parameter *Warning Threshold* determine per cent of *Data Limit* in the range of 50% to 99%, which if is exceeded, then the router sends an SMS in the form *Router has exceeded (value of Warning Threshold) of data limit*. By the parameter *Accounting Start* it is possible to specify day in month when it will start accounting defined in *Data limit*. If the parameter *Switch to backup SIM card when data limit is exceeded* (see next) or *Send SMS when datalimit is exceeded* (see SMS configuration) are not selected the data limit will not count.

At the bottom of configuration it is possible to set rules for switching between two APN's on the SIM card, in the event that one SIM card is inserted or between two SIM cards, in the event that two SIM cards are inserted. Parameter *Default SIM card* sets default APN or SIM card, from which it will try to establish the PPP connection. If this parameter is set to *none,* the router launches in off-line mode and it is necessary to establish PPP connection via SMS message.

If parameter Backup SIM card is set to none, then parameters *Switch to other SIM card when connection fails, Switch to backup SIM card when roaming is detected and Switch to backup SIM card when data limit is exceeded* switch the router to off-line mode.

If PPP connection fails, then the parameter *Switch to other SIM card when connection fails* ensures switch to secondary SIM card or secondary APN of the SIM card. Failure of the PPP connection can occur in two ways. When I start the router, when three fails to establish a PPP connection. Or if it is checked Check the PPP connection, and is indicated by the loss of a PPP connection.

In case that the roaming is detected the parameter *Switch to backup SIM card when roaming is detected* enables switching to secondary SIM card or secondary APN of the SIM card.

Parameter *Switch to backup SIM card when data limit is exceeded* enables switching to secondary SIM card or secondary APN of the SIM card, when the data limit of default APN is exceeded.

Parameter *Switch to primary SIM card after timeout* defines conditions, how to switch back to the default SIM card or default APN.

Parameter Switch to backup SIM card when binary input is active enables switching to secondary SIM card or secondary APN of the SIM card, when binary input 'bin0' is active.

Parameter *Switch to primary SIM card after timeout* enable defines the method, how the router will try to switch back to default SIM card or default APN.

The following parameters define the time after which the router attempts to go back to the default SIM card or APN. The first attempt to switch back to the primary SIM card or APN shall be made for the time defined in the parameter Initial Timeout, range of this parameter is from 1 to 10000 minutes. In an unsuccessful attempt to switch to default SIM card, the router on the second attempt to try for the time defined in the parameter Subsequent Timeout, range is from 1 to 10000 minutes. Any further attempt to switch back to the primary SIM card or APN shall be made in time computed as the sum of the previous time trial and time defined in the parameter Additive constants range is 1-10000 minutes.

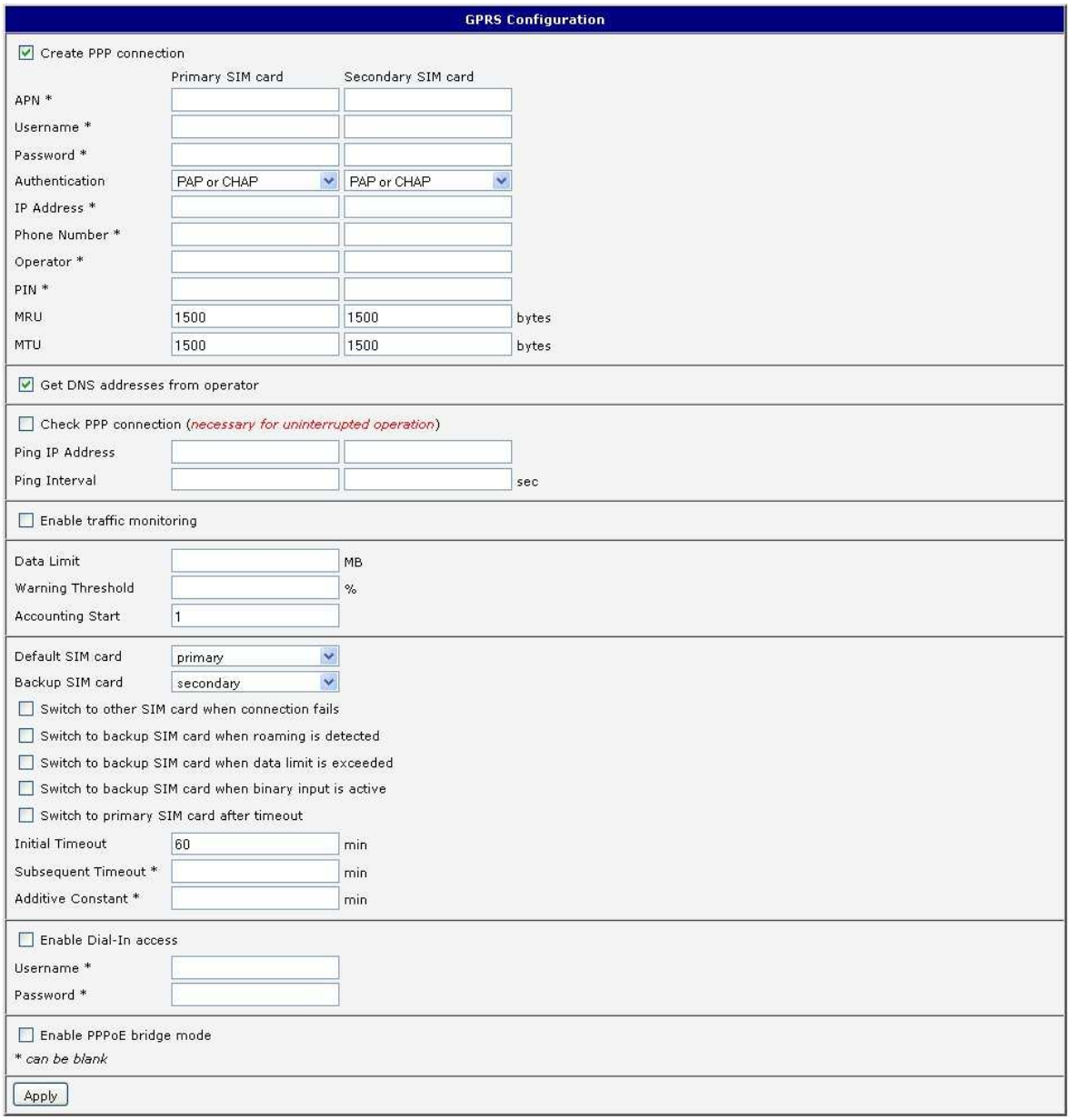
Example: If parameter *Switch to primary SIM card after timeout* is checked and parameters are set as follows *Initial Timeout* – 60min. *Subsequent Timeout* 30min a *Subsequent Timeout* - 20min.The first attempt to switch the primary SIM card or APN shall be carried out after 60 minutes. Switched to a failed second attempt made after 30 minutes. Third after 50 minutes (30 +20). Fourth after 70 minutes (30 +20 +20).

Parameter *Initial Timeout* sets the time after which the Router tries to make connection with default APN, range of this parameter is from 1 to 10000 minutes. Parameter *Subsequent Timeout* sets the time period for every other next attempt to make connection with default APN, range is from 1 to 10000 minutes. Parameter *Additive Constant* sets the amount of time which is added to every attempt at main connection establishment after unsuccessful defined attempt (for example: Additive Constant is 15 minutes. After a second unsuccessful attempt at main connection establishment time of next attempt is extended by about 30 minutes etc.). Range is from 1 to 1000 minutes.

In the bottom part of the window it is possible to define access over CSD connection by *Enable Dial-In Access* function. Access can be secured by used the *Username* and *Password*. When the router is in offline mode, the router is permanently available via CSD connection.

If the *Enable PPPoE bridge mode* option selected, it activate the PPPoE bridge protocol PPPoE (point-to-point over ethernet) is a network protocol for encapsulating Point-to-Point Protocol (PPP) frames inside Ethernet frames. Allows you to create a PPPoE connection from the device behind router. For example from PC which is connected to ETH port router. There will be allot Ip address of SIM card to PC.

The changes in settings will apply after pressing the *Apply* button.



Attention! We recommend checking the GPRS connection in case of uninterrupted running.

Annotation:

- MTU (Maximum Transmission Unit) – it is the identifier of the maximum size of packet, which is possible to transfer in a given environment.
- MRU (Maximum Receiving Unit) – it is the identifier of the maximum size of packet, which is possible to receive in a given environment.

Default value is 1500 bytes. Other settings may cause incorrect transmission of data.

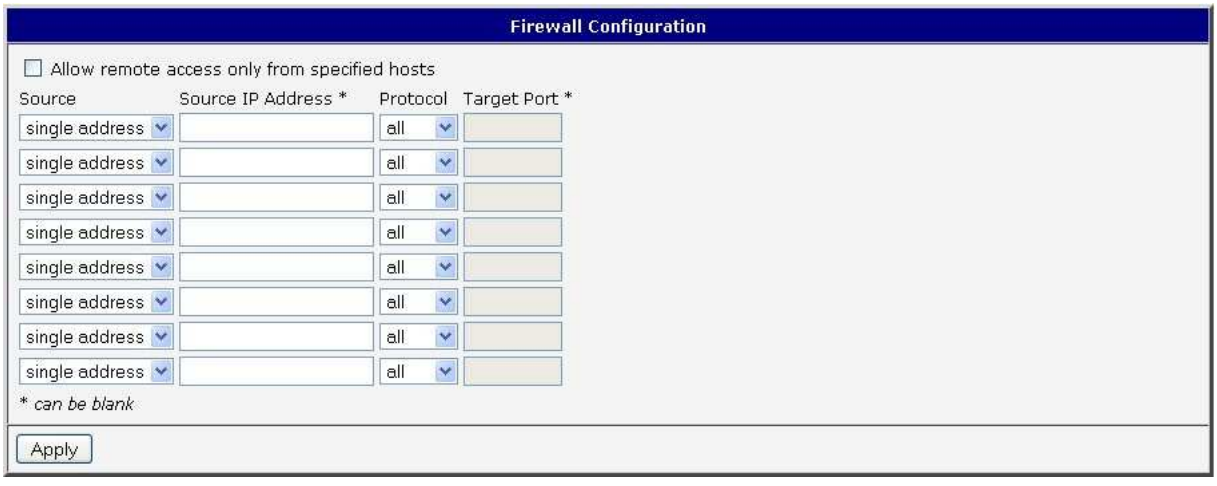
6.10. *Firewall Configuration*

By the help of a firewall it is possible to set IP addresses from which are possible to remotely access the router. The choice *Allow remote access only from specified hosts* is given for easier configuration of hosts. In this firewall configuration it is possible to set up to four remote accesses by the help of *Source*, *Source IP Address*, *Protocol* and *Target Port*.

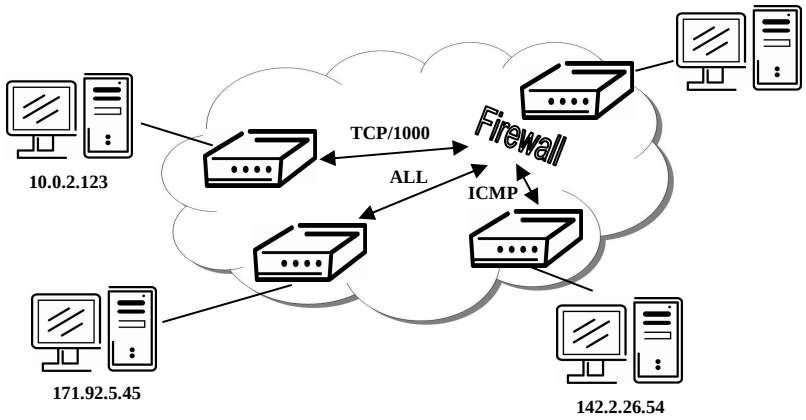
Parameter *Source* defines if access is allowed to one IP address which is defined by *Source IP Address*, or every IP addresses. In menu *Protocol* it is possible to specify protocol for remote access, it is possible to allow all protocols (*all*), or only one protocol *UDP*, *TCP*
or *ICMP*. By parameter *Target Port* it is possible to specify a port number.

The changes in settings will apply after pressing the *Apply* button.

Caution! Firewall doesn't filter via Ethernet.



Example of the firewall configuration:



Firewall Configuration

☑ Allow remote access only from specified hosts

Source	Source IP Address *	Protocol	Target Port *
single address	171.92.5.45	all	
single address	10.0.2.123	TCP	1000
single address	142.2.26.54	ICMP	
single address		all	
single address		all	
single address		all	
single address		all	
single address		all	

** can be blank*

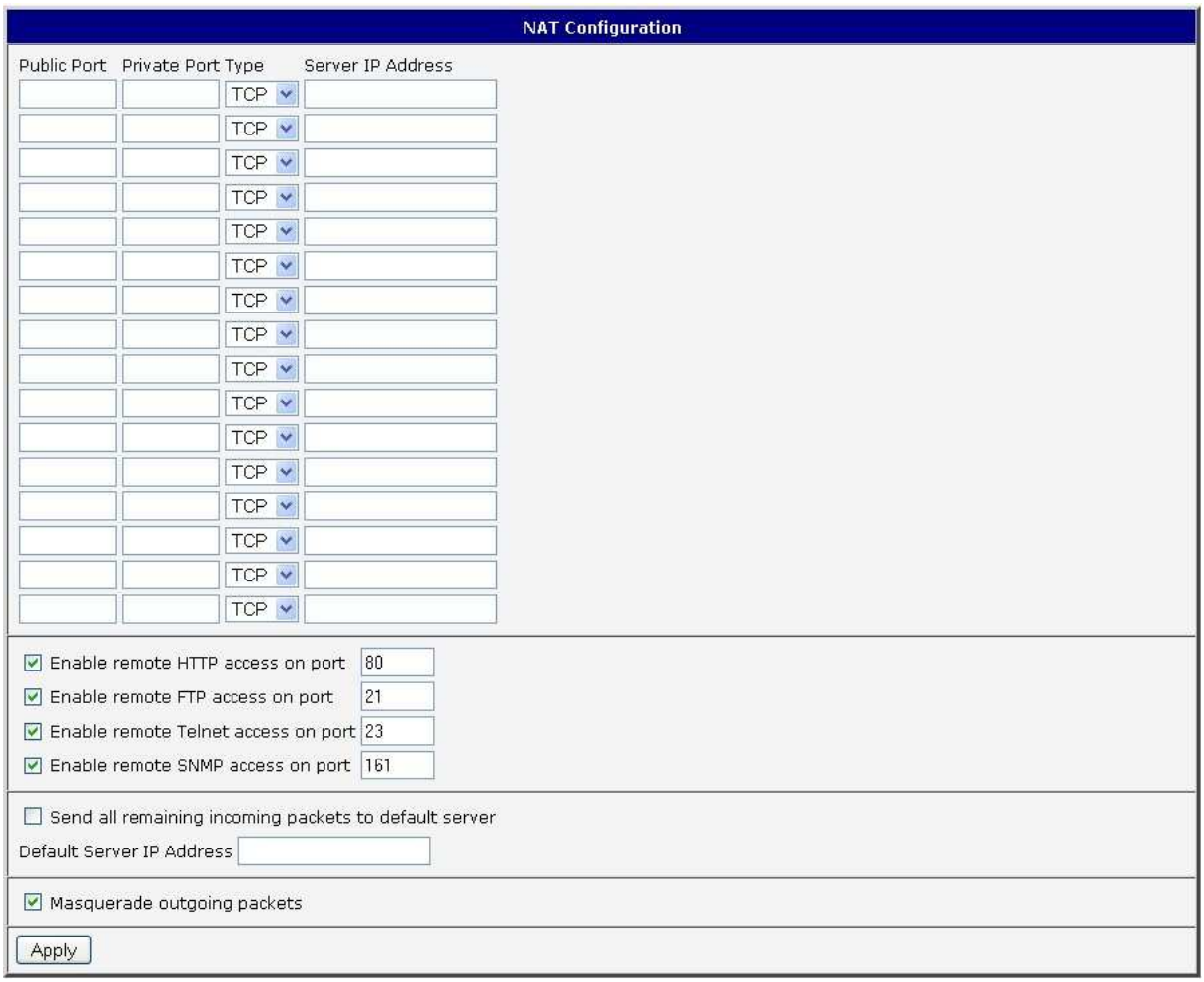
Apply

6.11. *NAT Configuration*

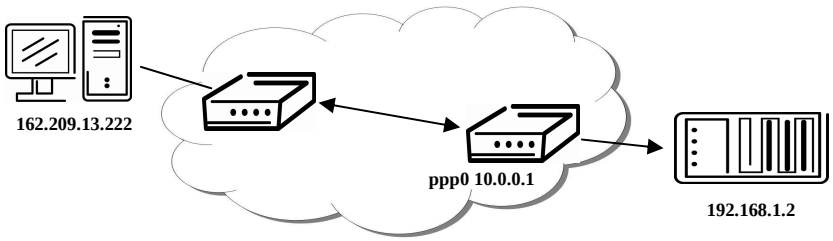
To enter the Network Address Translation configuration, select the *NAT* menu item. By checking off the *Send all incoming packets to default server* item and setting the *Default Server* item it is possible to put the router into the mode in which all incoming data from GPRS will be routed to the computer with the defined IP address.

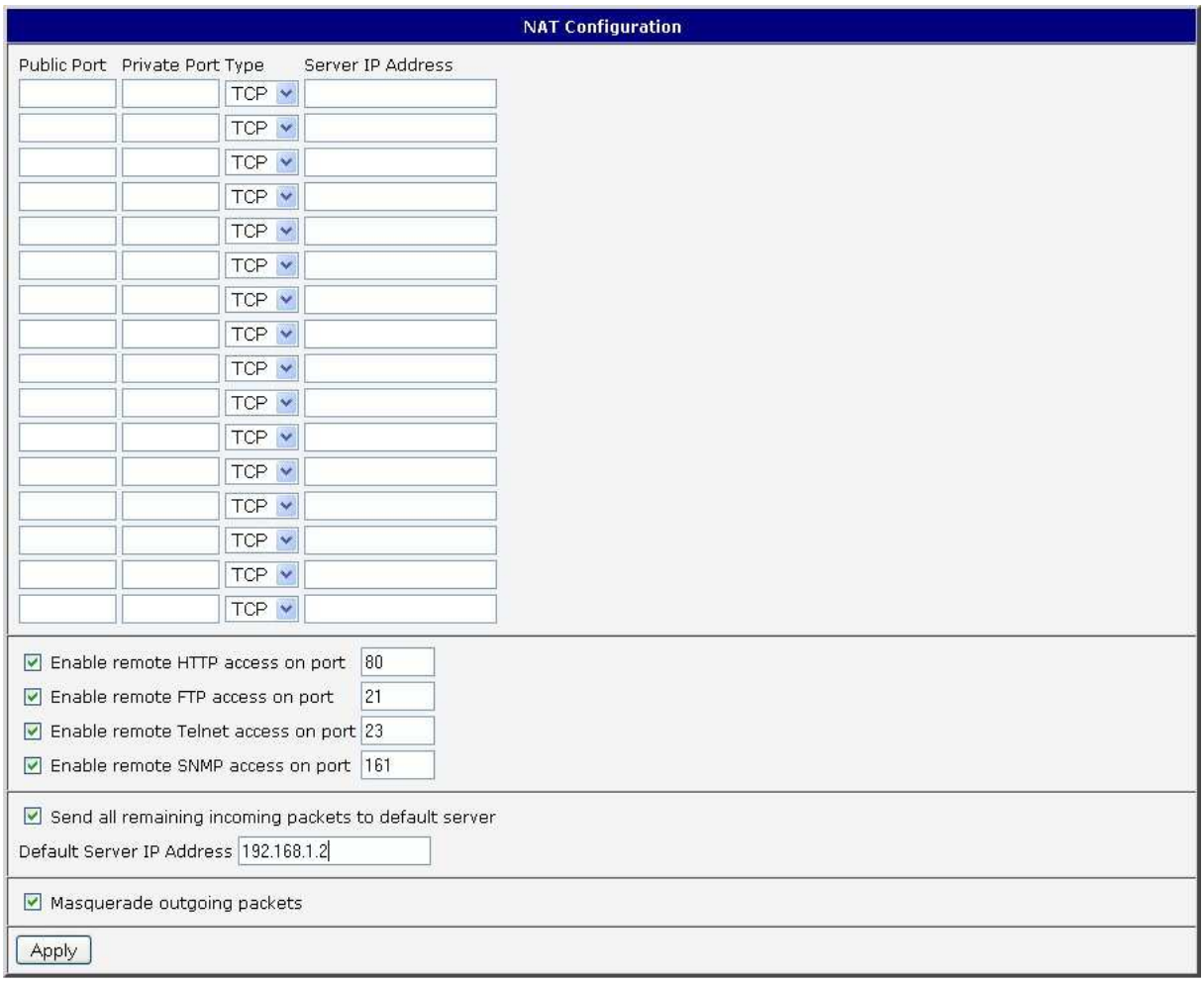
If the *Enable remote HTTP access* field and port number is filled in, then configuration of the router over web interface is possible. Choice *Enable remote FTP access on port* and port number makes it possible to access over *FTP*. Choice *Enable remote Telnet access* and port number makes it possible to access over Telnet. Choice *Enable remote SNMP access* and port number makes it possible to access to SNMP agent. Choice *Masquerade outgoing packets* option turns the system address translation NAT.

The changes in settings will apply after pressing the *Apply* button.



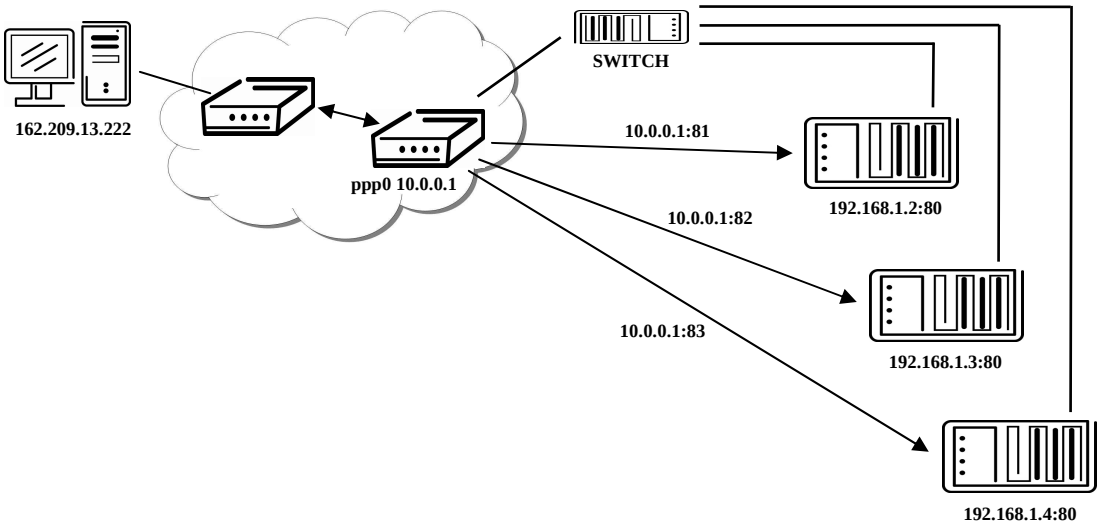
Example of the configuration with one connection equipment on the router:




NAT Configuration
Public Port
Private Port
Type
Server IP Address
TCP
Enable remote HTTP access on port 80
Enable remote FTP access on port 21
Enable remote Telnet access on port 23
Enable remote SNMP access on port 161
Send all remaining incoming packets to default server
Default Server IP Address 192.168.1.2
Masquerade outgoing packets
Apply

In these configurations it is important to have marked choice of *Send all remaining incoming packets it default server*, IP address in this case is the address of the device behind the router. Connected equipment behind the router must have set Default Gateway on the router. Connected device replies, while PING on IP address of SIM card.

Example of the configuration with more connected equipment:



NAT Configuration

Public Port	Private Port	Type	Server IP Address
80	80	TCP	192.168.1.2
82	80	TCP	192.168.1.3
83	80	TCP	192.168.1.4
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	
		TCP	

- [x] Enable remote HTTP access on port 80
- [x] Enable remote FTP access on port 21
- [x] Enable remote Telnet access on port 23
- [x] Enable remote SNMP access on port 161

- [ ] Send all remaining incoming packets to default server

Default Server IP Address

- [x] Masquerade outgoing packets

Apply

In this configuration equipment wired behind the router defines the address *Server IP Address*. The router replies, while PING on address of SIM card. Access on web interface of the equipment behind the router is possible by the help of Port Forwarding, when behind IP address of SIM is indicating public port of equipment on which we want to come up. At demand on port 80 it is surveyed singles outer ports (Public port), there this port isn't defined, therefore at check selection Enable remote http access it automatically opens the web interface router. If this choice isn't selected and is selected volition Send all remaining incoming packets to the default server fulfill oneself connection on induction IP address. If it is not selected election Send all remaining incoming packets to default server and Default server IP address then connection requests a failure. If it is necessary to set more than 8 rules for NAT, then it is possible to insert into start up script following script.

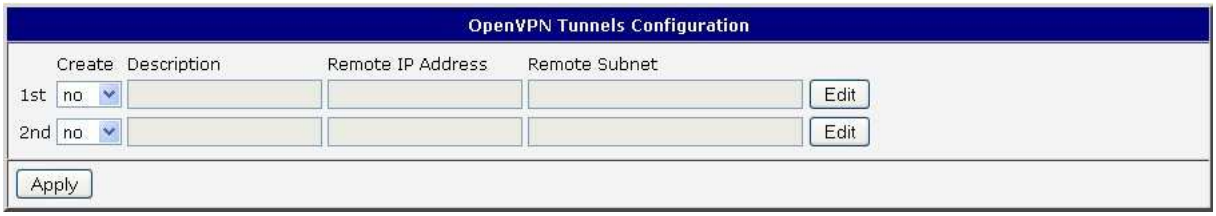
If necessary set more than twelve rules for NAT, then is possible insert into start up script following script:

iptables -t nat -A napt -p tcp --dport [PORT_PUBLIC] -j DNAT --to-destination [IPADDR]:[PORT1_PRIVATE]

Concrete IP address [IPADDR] and ports numbers [PORT_PUBLIC] and [PORT1_PRIVATE] are filled up into square bracket.

6.12. *OpenVPN Tunnel Configuration*

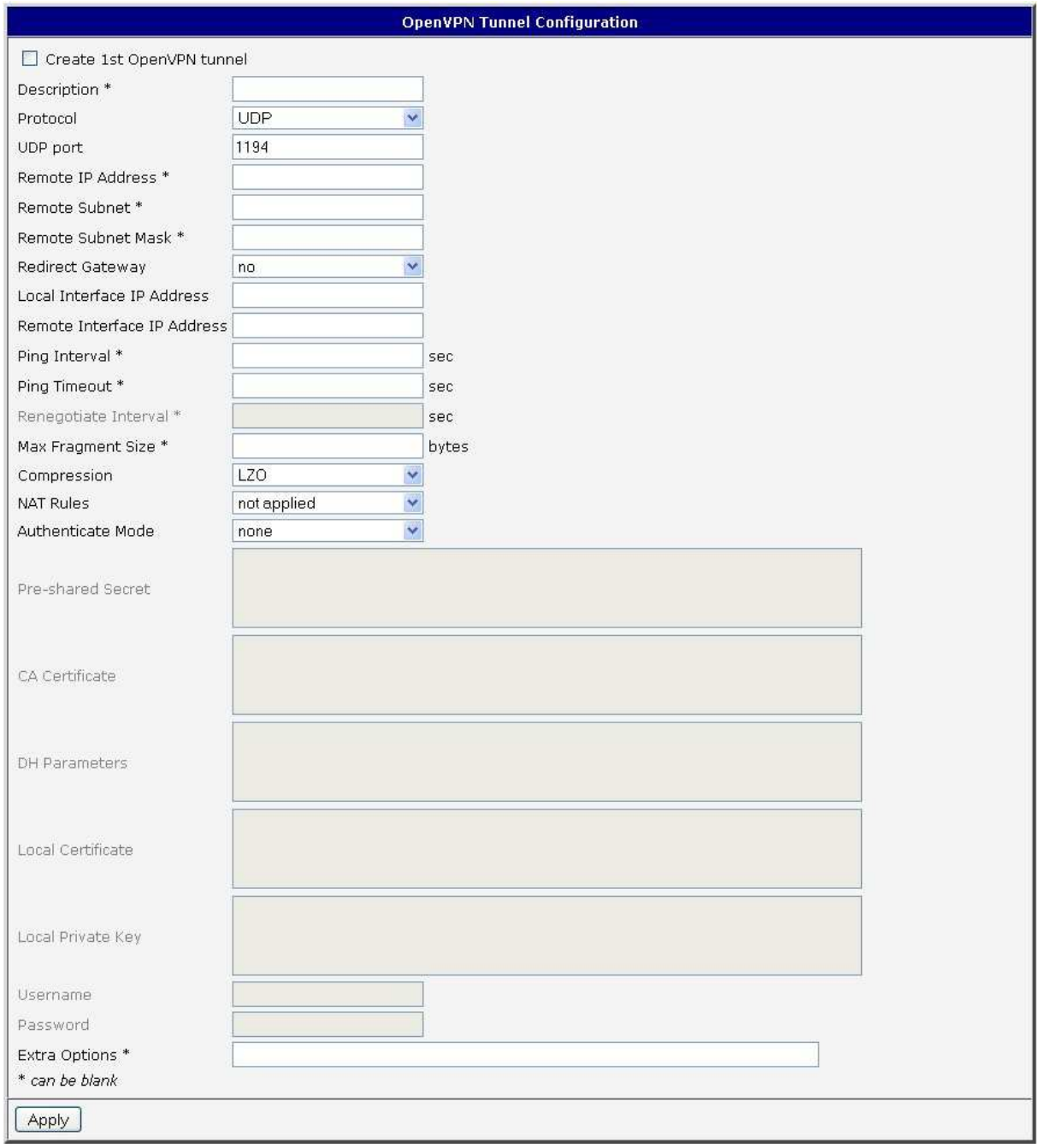
OpenVPN tunnel configuration can be called up by option *OpenVPN* item in the menu. OpenVPN tunnel allows protected connection of two networks LAN to the one which looks like one homogenous. In the *OpenVPN Tunnels Configuration* window are two rows, each row for one configured OpenVPN tunnel. The column *Create* switches on tunnels, other columns contain values view set in the *OpenVPN Tunnel Configuration* windows; configuration is possible by the *Edit* button.



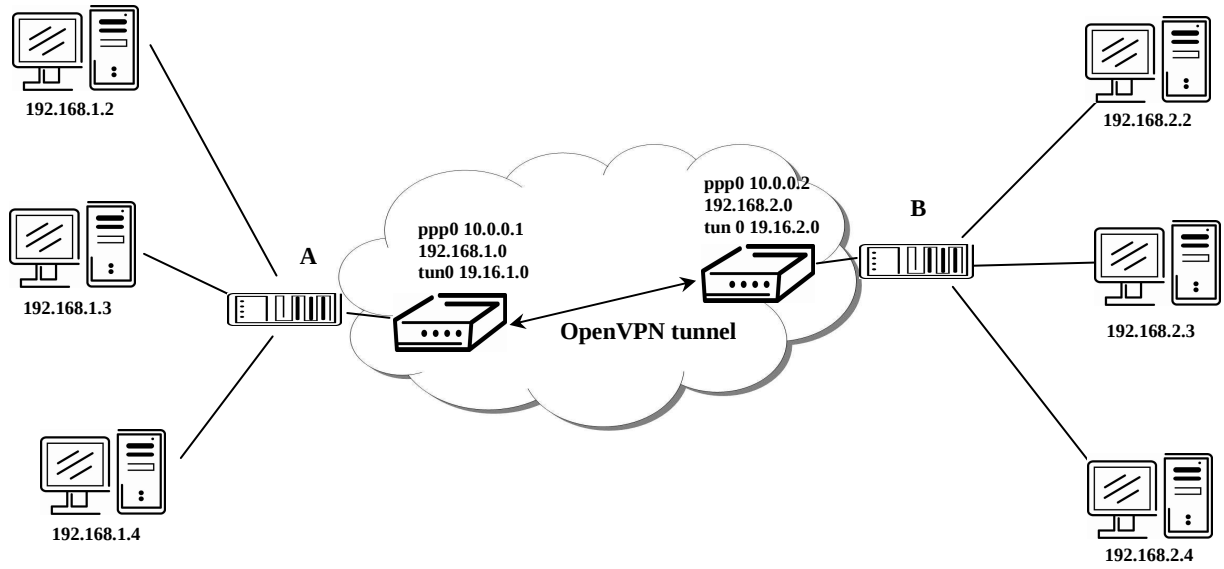
In the window can be defined tunnel name (*Description*) and *Protocol*, by which the tunnel will communicate. At choice is *UDP*, *TCP server* or *TCP client* protocol which has to have defined *port* protocol (*UDP port* nebo *TCP port*). On off - side tunnel IP address (*Remote External IP Address*), address nets behind off - side tunnel (*Remote Subnet*), mask nets behind off - side tunnel (*Remote Subnet Mask*). By parameter Redirect Gateway is possible to redirect all traffic on Ethernet. Parameter *Local Interface IP Address* defines local interface IP address, parameter *Remote Interface IP Address* defines the interface IP address of the off-side tunnel. Parameter *Ping Interval* defines the time period after which it sends a message to off-side and by parameter *Ping Timeout* waits on message from off-side tunnel. For OpenVPN tunnel right verify parameter *Ping Timeout* has to be bigger than *Ping Interval*. Parameter *Renegotiate Interval* sets renegotiate period (reauthorization) of the OpenVPN tunnel. This parameter is possible to set only at username/password authentication or at X.509 certificate using. By parameter *Max Fragment Size* it is possible to define maximum sending packet size. Sending data is possible compress by lossless LZO compressions by parameter Compression, compression has to be on both tunnel ends. By parameter *NAT Rules* it is possible to apply set NAT rules to OpenVPN tunnel.

By *Authenticate Mode* it is possible to choose authentication. On choice are *none* authentication, or by *Pre-shared secret* which set shared key for both off-side tunnel; or by *Username/Password* which enable authentication by *CA Certificate*, *Username* and *Password*; next can be *X.509 Certificate (client)*, this enables authentication by *CA Certificate*, *Local Certificate* and *Local Private Key*; last possibility is *X.509 Certificate (server)* which enables authentication by *CA Certificate*, *DH Parameters*, *Local Certificate* and *Local Private Key*. By the help of parameter *Extra Options* it is possible to define additional parameters of the OpenVPN tunnel, for example DHCP options etc.

The changes in settings will apply after pressing the *Apply* button.



Example of the OpenVPN tunnel configuration:

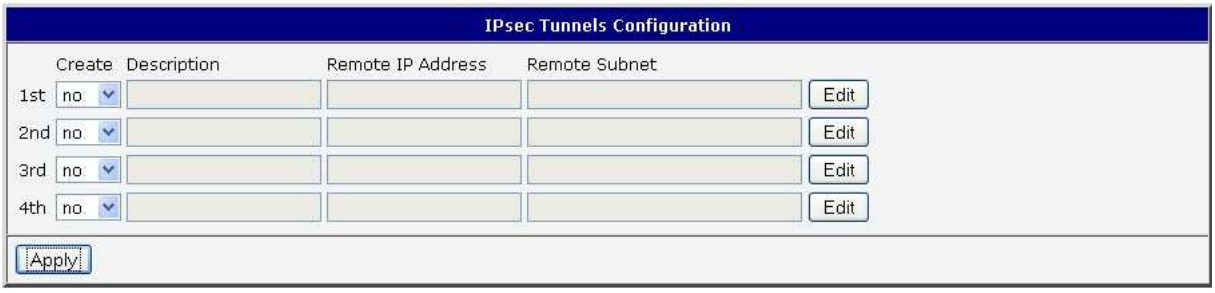


OpenVPN tunnel configuration:

	A	B
Protocol	UDP	UDP
UDP Port	1194	1194
Remote IP Address:	10.0.0.2	10.0.0.1
Remote Subnet:	192.168.2.0	192.168.1.0
Remote Subnet Mask:	255.255.255.0	255.255.255.0
Local Interface IP Address:	19.16.1.0	19.16.2.0
Remote Interface IP Address:	19.16.2.0	19.18.1.0
Compression	LZO	LZO
Authenticate mode:	none	none

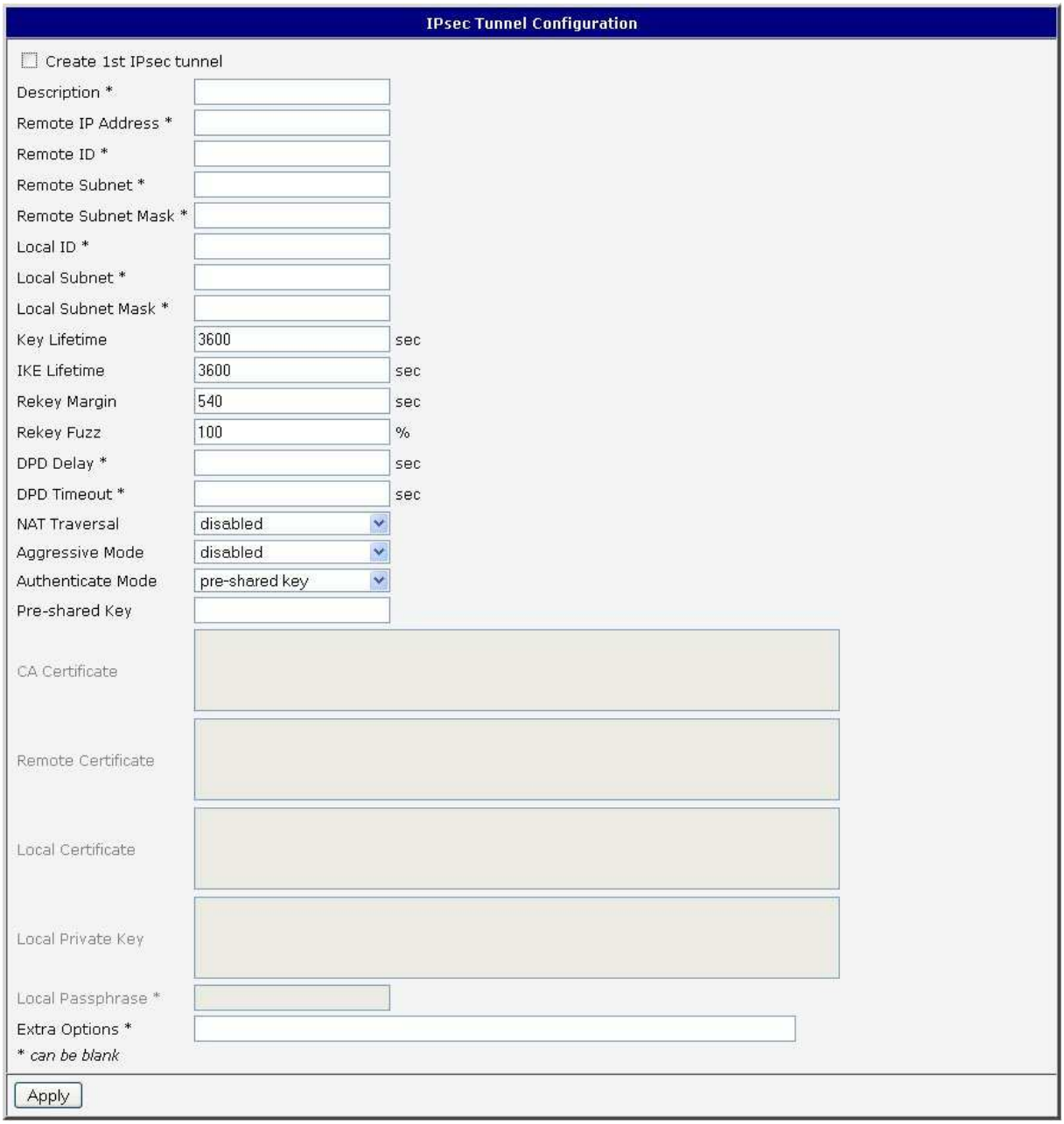
6.13. *IPSec Tunnel Configuration*

IPsec tunnel configuration can be called up by option *IPsec* item in the menu. IPsec tunnel allows protected connection of two networks LAN to the one which looks like one homogenous. In the *IPsec Tunnels Configuration* window are four rows, each row for one configured IPSec tunnel. The column *Create* switches on tunnels, other columns contain values view set in the *IPsec Tunnel Configuration* windows; configuration is possible by the *Edit* button.

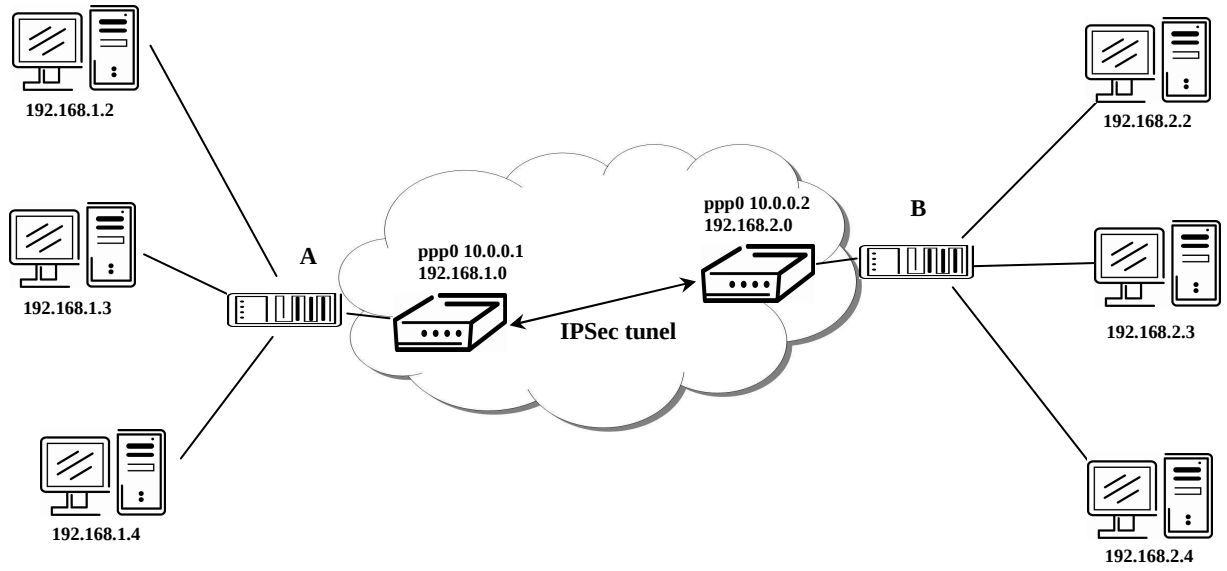


In the *IPsec Tunnel Configuration* windows it is possible to define the tunnel name (Description), off - side tunnel IP address (*Remote IP Address*), identification of off-side tunnel or domain name (*Remote ID*), address nets behind off - side tunnel (*Remote Subnet*), mask nets behind off - side tunnel (*Remote Subnet Mask*), identification of local side (*Local ID*), local subnet address (*Local Subnet*), local network mask (*Local Subnet Mask*), sharable key for both parties tunnel (*Pre shared Key*), service life keys (*Key Lifetime*) and service life IKA SA (*IKE Lifetime*). *Rekey Margin* specifies how long before connection expiry should attempt to negotiate a replacement begin. *Rekey Fuzz* specifies the maximum percentage by which *Rekey Margin* should be randomly increased to randomize re-keying intervals. Parameter *DPD Delay* defines time after which is made IPsec tunnel verification. By parameter *DPD Timeout* is set timeout of the answer. If address translation between two end points of the IPsec tunnel is used, it needs to allow NAT Traversal (*Enabled*). If parameter *Aggressive mode* is enabled, then establishing of IPsec tunnel will be faster, but encryption will set permanently on 3DES-MD5. Authentication is possible to set by parameter *Authenticate mode*, at choice are following possibilities: *Pre-shared key* or *X.509 Certificate*. Parameter *Pre-shared Key* set shared key for both off-side tunnel. At authentication by X.509 certificate it is necessary put in certificates *CA Certificate*, *Remote Certificate* and *Local Certificate* and private key *Local Private Key* and *Local Passphrase*. The certificates and private keys have to be in PEM format. As certificate it is possible to use only certificate which has start and stop tag certificate. Parameters ID contain two parts: *hostname* and *domain-name*. Items which can be blank, are used for to exact IPsec tunnel identification. By the help of parameter *Extra Options* it is possible to define additional parameters of the IPsec tunnel, for example secure parameters etc.

The changes in settings will apply after pressing the *Apply* button.


IPsec Tunnel Configuration
Create 1st IPsec tunnel
Description *
Remote IP Address *
Remote ID *
Remote Subnet *
Remote Subnet Mask *
Local ID *
Local Subnet *
Local Subnet Mask *
Key Lifetime 3600 sec
IKE Lifetime 3600 sec
Rekey Margin 540 sec
Rekey Fuzz 100 %
DPD Delay * sec
DPD Timeout * sec
NAT Traversal disabled
Aggressive Mode disabled
Authenticate Mode pre-shared key
Pre-shared Key
CA Certificate
Remote Certificate
Local Certificate
Local Private Key
Local Passphrase *
Extra Options *
* can be blank
Apply

Example of the IPSec Tunnel configuration:

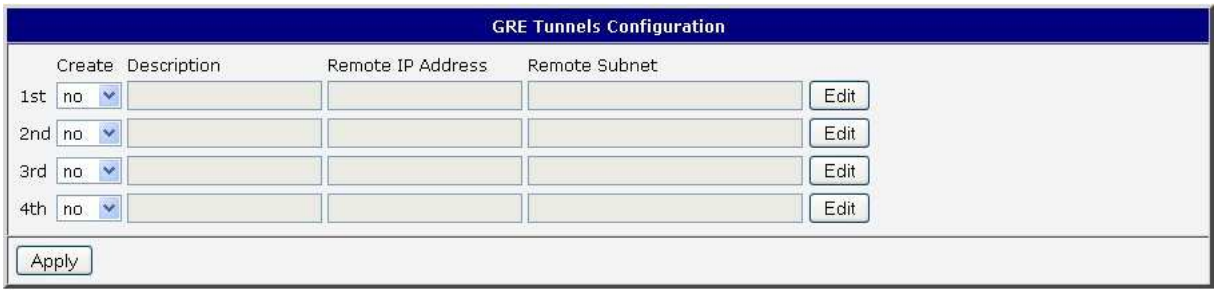


IPsec tunnel configuration:

	A	B
Remote IP Address:	10.0.0.2	10.0.0.1
Remote Subnet:	192.168.2.0	192.168.1.0
Remote Subnet Mask:	255.255.255.0	255.255.255.0
Local Subnet:	192.168.1.0	192.168.2.0
Local Subnet Mask:	255.255.255.0	255.255.255.0
Authenticate mode:	pre-shared key	pre-shared key
Pre-shared key	test	test

6.14. *GRE Tunnels Configuration*

To enter the GRE tunnels configuration, select the *GRE* menu item. It is possible to configure up to four GRE tunnels. In the *GRE Tunnels Configuration* window are four rows, each row for one configured GRE tunnel. The column *Create* switches on tunnels, other columns contain values view set in the *GRE Tunnel Configuration* windows; configuration is possible by *Edit* button.

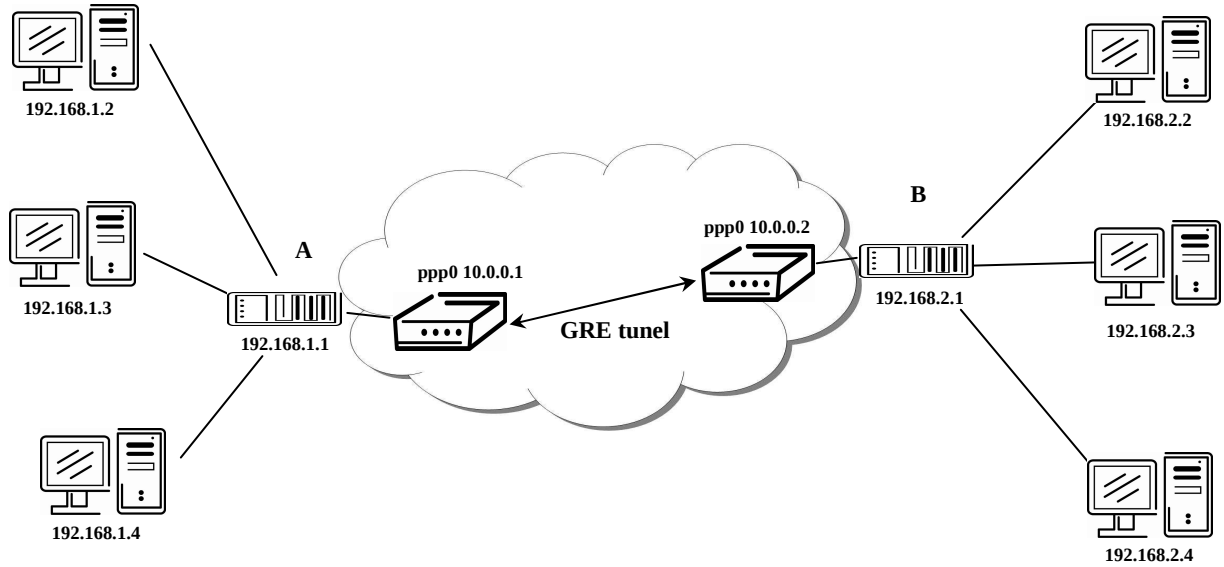


The tunnels are active after selecting *Create x GRE tunnel*. In the singles window it is possible to define the IP address of the remote side of the tunnel (*Remote External IP Address*), internal IP address of the local side of the tunnel (*Local Internal IP Address*), internal IP address of the remote side of the tunnel (*Remote Internal IP Address*), address of the network behind the remote side of the tunnel (*Remote Subnet*) and the mask of the network behind the remote side of the tunnel (*Remote Subnet Mask*). The GRE tunnel is used for connection of two networks to one that appears as one homogenous. Last item ("*Pre-shared Key*") defines 32b number that identifies shared key of tunnel. This code must be on both sides of same, differently router drops packets.

Attention, GRE tunnel doesn't connect itself via NAT.

The changes in settings will apply after pressing the *Apply* button.

Example of the GRE Tunnel configuration:



GRE tunnel Configuration:

	A	B
Remote External IP Address:	10.0.0.2	10.0.0.1
Remote Subnet:	192.168.2.0	192.168.1.0
Remote Subnet Mask:	255.255.255.0	255.255.255.0

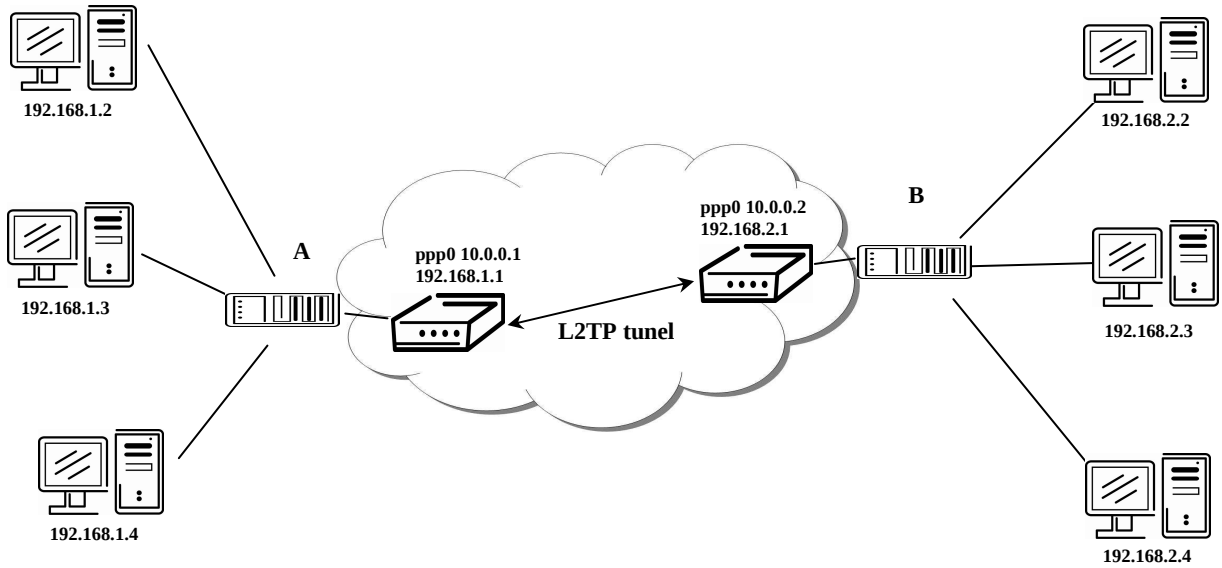
6.15. *L2TP Configuration*

To enter the L2TP tunnels configuration, select the *L2TP* menu item. L2TP tunnel allows protected connection by password of two networks LAN to the one which it looks like one homogenous. The tunnels are active after selecting *Create L2TP tunnel*.

In the window it is possible to define L2TP tunnel mode (Mode) on the router side, in case of client IP address of server (Server IP Address), start IP address in range, which is offered by server to clients (Client Start IP Address), end IP address in range, which is offered by server to clients (Client End IP Address), IP address of the local side of the tunnel (Local IP Address), IP address of the remote side of the tunnel (Remote IP Address), address of the network behind the remote side of the tunnel (Remote Subnet), the mask of the network behind the remote side of the tunnel (Remote Subnet Mask), username for login to L2TP tunnel (Username) and password (Password).

The changes in settings will apply after pressing the *Apply* button.

Example of the L2TP Tunnel configuration:



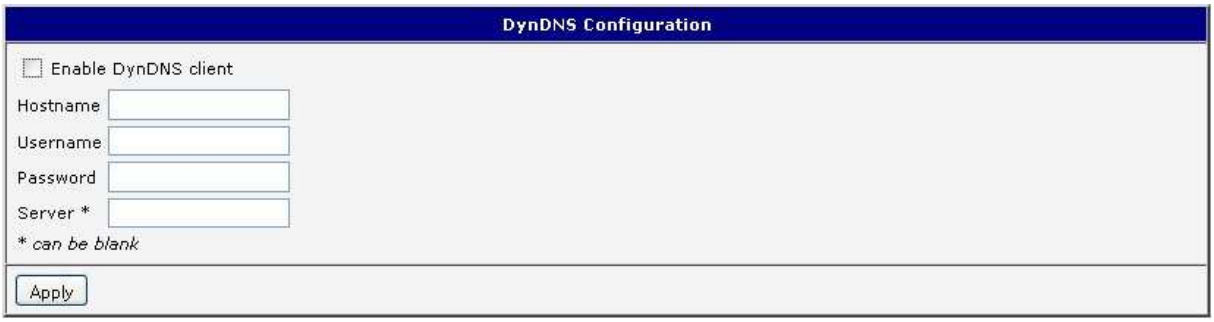
Configuration of the L2TP tunnel:

	A	B
Mode	L2TP Server	L2TP Client
Server IP Address	---	10.0.0.1
Client Start IP Address:	192.168.3.2	---
Client End IP Address:	192.168.3.254	---
Local IP Address:	192.168.3.1	---
Remote IP Address	---	---
Remote Subnet	192.168.2.0	192.168.1.0
Remote Subnet Mask	255.255.255.0	255.255.255.0
Username	username	username
Password	password	password

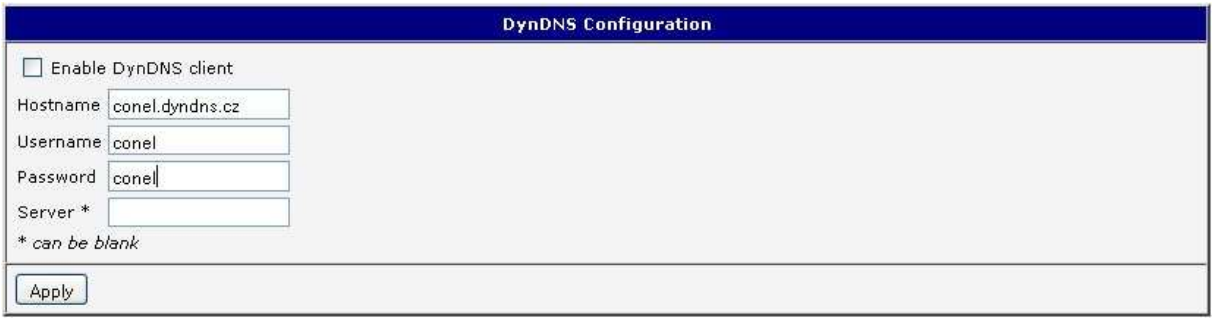
6.16. *DynDNS Client Configuration*

DynDNS client Configuration can be called up by option DynDNS item in the menu. In the window can be defined a third order domain registered on server www.dyndns.org (*Hostname*), user name (*Username*) and password (*Password*). If you want to use a different server than www.dyndns.org, fill in his address to the item server (*Server*). If this item is left blank, the default server is used.

The changes in settings will apply after pressing the *Apply* button.



Example of the DynDNS client configuration with domain conel.dyndns.org, username conel, password conel and default server http://members.dyndns.org:



If DNS servers are not assigned by the operator, then it is possible to configure it by inserting of script into start up window:

echo “nameserver xxx.xxx.xxx.xxx“ > /etc/resolf.conf, where xxx.xxx.xxx.xxx is IP address of the first DNS server,

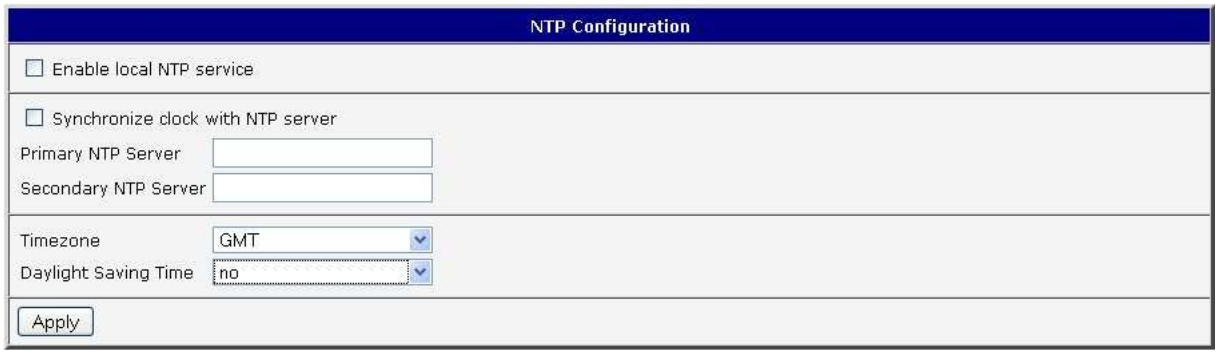
echo “nameserver yvy.yyy.yyy.yyy“ >> /etc/resolf.conf, where yvy.yyy.yyy.yyy is IP address of the second DNS server.

6.17. *NTP Client Configuration*

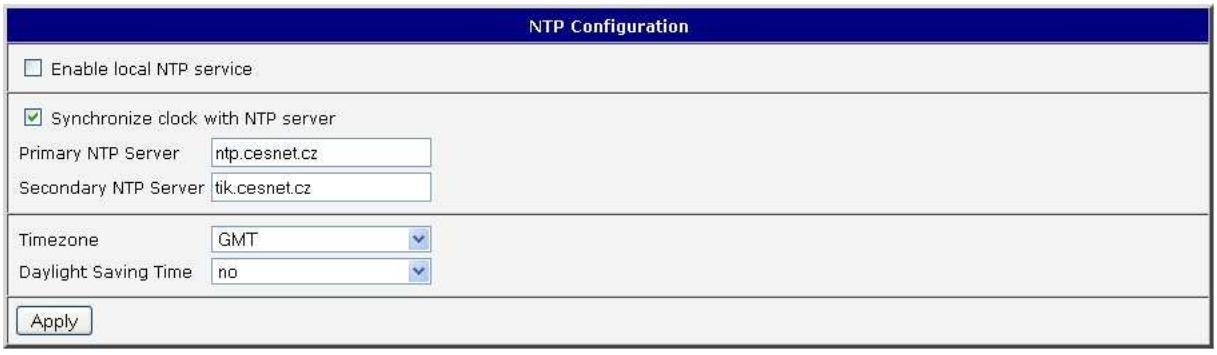
NTP client Configuration can be called up by option NTP item in the menu. In the window can be defined the address prime (Primary NTP server Address) and econdary NTP server (Secondary NTP server Address), by the help of which the router, after first interface to the GPRS from make power supply, will adjust the inner clock. Example of NTP server address can be seenon ntp.isc.org/bin/view/Servers/StratumOneTimeServers. By parameter *Timezone* it is possible to set the time zone of the router. By parameter *Daylight Saving Time* is possible to define time shift.

By parameter *Enable local NTP service* it is possible to set the router in mode, that it can serve as NTP server for other devices.

The changes in settings will apply after pressing the *Apply* button.



Example of the NTP configuration with set primary and secondary NTP server and with daylight saving time:



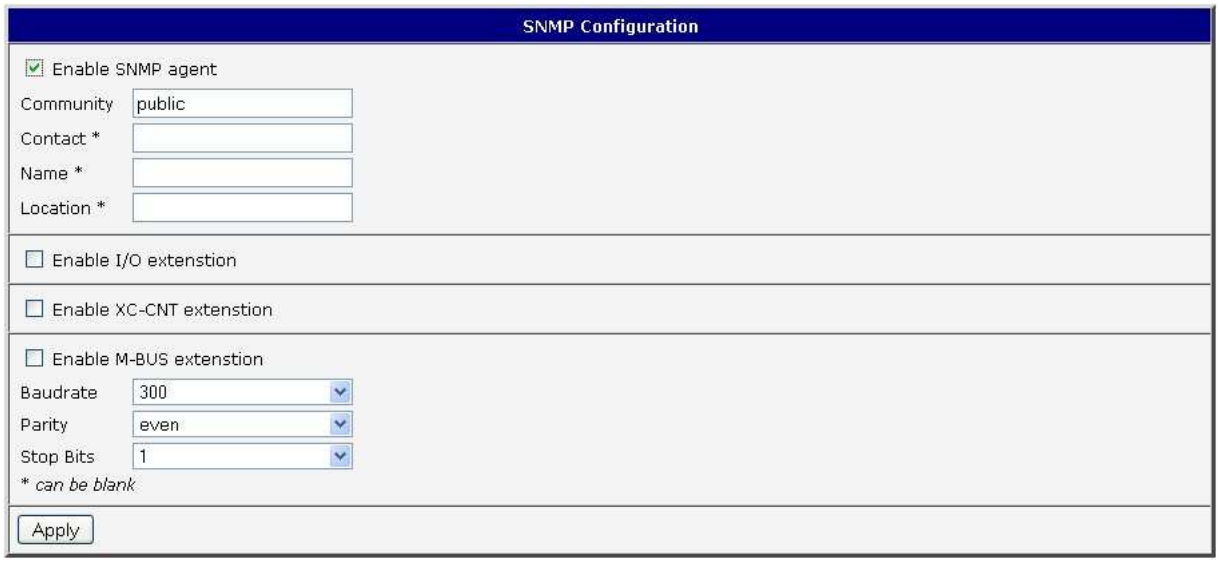
6.18. *SNMP Configuration*

To enter the SNMP Configuration it is possible with SNMP agent ver.1 configuration which sends information about the router, eventually about the status of the expansion port CNT or M-BUSD.

The *Community* item defines the password for access to the SNMP agent. Item *Contact* identifies a person who manages the router together with information how to contact this person, item *Name* is the designation of the router and item *Location* describes the physical placing of the router.

By choosing *Enable I/O extension* it is possible to monitor binary inputs I/O on the router, by choosing *Enable XC-CNT extension* it is possible to monitor the expansion port CNT inputs status or by choosing *Enable M-BUS extension* and enter the *Baudrate*, *Parity* and *Stop Bits* it is possible to monitor the meter status connected to the expansion port

M-BUSD status. Parameters *Enable XC-CNT extension and Enable M-BUS extension* can not be checked together.



Every monitor value is uniquely identified by the help of number identifier **OID** - *Object Identifier*. OID is finished by „.9“.

For binary input and output the following range of OID is used:

OID	Description
.1.3.6.1.4.1.30140.2.3.1.0	Binary input BIN0 (values 0,1)
.1.3.6.1.4.1.30140.2.3.2.0	Binary output OUT0 (values 0,1)

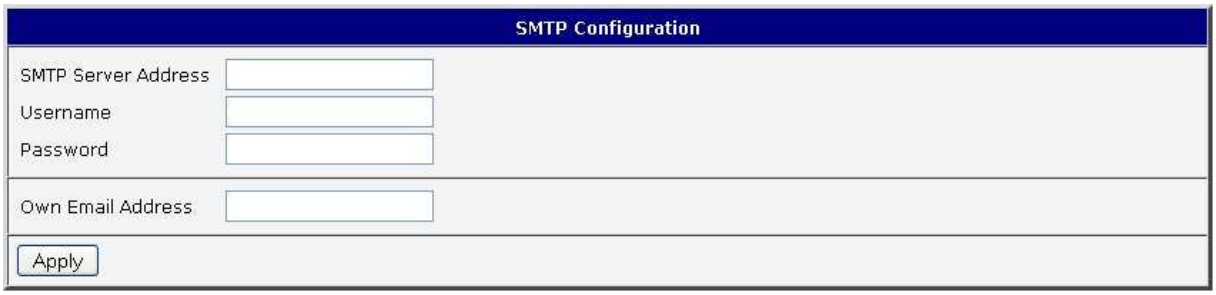
For the expansion port CNT the following range of OID is used:

OID	Description
.1.3.6.1.4.1.30140.2.1.1.0	Analogy input AN1 (range 0-4095)
.1.3.6.1.4.1.30140.2.1.2.0	Analogy input AN2 (range 0-4095)
.1.3.6.1.4.1.30140.2.1.3.0	Counter input CNT1 (range 0-4294967295)
.1.3.6.1.4.1.30140.2.1.4.0	Counter input CNT2 (range 0-4294967295)
.1.3.6.1.4.1.30140.2.1.5.0	Binary input BIN1 (values 0,1)
.1.3.6.1.4.1.30140.2.1.6.0	Binary input BIN2 (values 0,1)
.1.3.6.1.4.1.30140.2.1.7.0	Binary input BIN3 (values 0,1)
.1.3.6.1.4.1.30140.2.1.8.0	Binary input BIN4 (values 0,1)

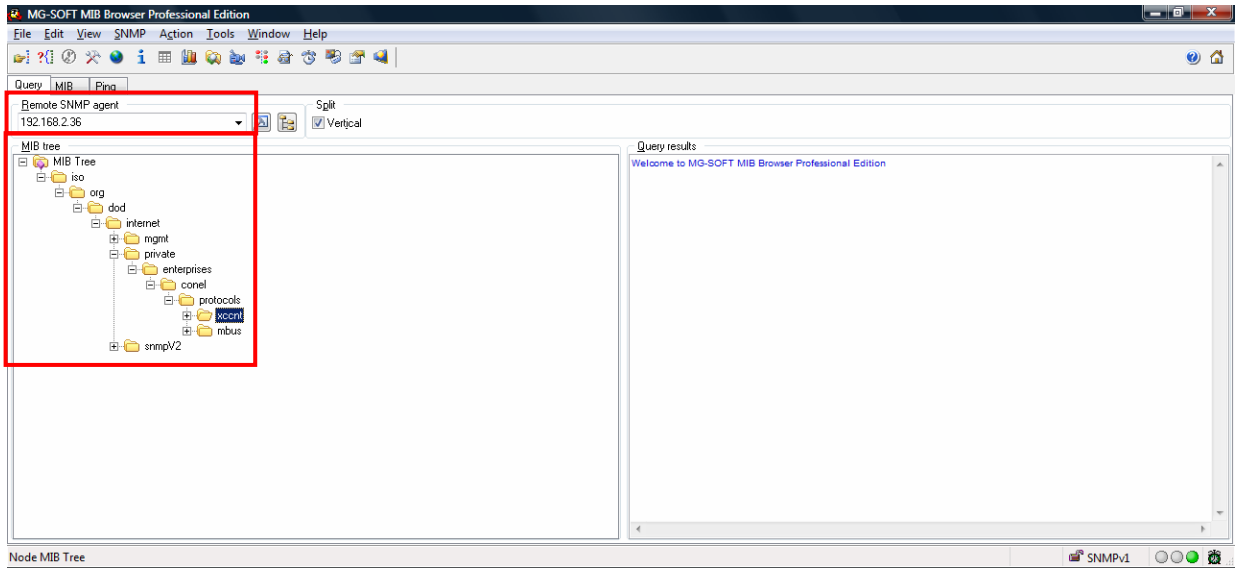
For the expansion port M-BUSD the following range of OID is used:

OID	Description
.1.3.6.1.4.1.30140.2.2.<address>.1.0	IdNumber – meter number
.1.3.6.1.4.1.30140.2.2.<address>.2.0	Manufacturer
.1.3.6.1.4.1.30140.2.2.<address>.3.0	Version – specified meter version
.1.3.6.1.4.1.30140.2.2.<address>.4.0	Medium – type of metered medium
.1.3.6.1.4.1.30140.2.2.<address>.5.0	Status – errors report
.1.3.6.1.4.1.30140.2.2.<address>.6.0	0. VIF – value information field
.1.3.6.1.4.1.30140.2.2.<address>.7.0	0. measured value
.1.3.6.1.4.1.30140.2.2.<address>.8.0	1. VIF – value information field
.1.3.6.1.4.1.30140.2.2.<address>.9.0	1. measured value
…	…
.1.3.6.1.4.1.30140.2.2.<address>.100.0	47. VIF – value information field
.1.3.6.1.4.1.30140.2.2.<address>.101.0	47. measured value

The meter address can be from range 0..254 when 254 is broadcast.



Example of the MIB browser:



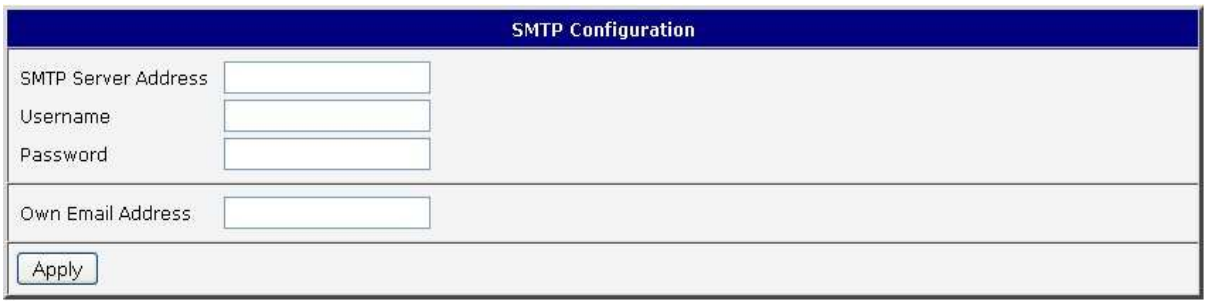
It is important to set the IP address of the SNMP agent (router) in field *Remote SNMP agent*. After enter the IP address is in a *MIB tree* part is possible show object identifier. The path to objects is:

iso->org->dod->internet->private->enterprises->conel->protocols.

6.19. *SMTP Configuration*

To enter the SMTP it is possible configure SMTP client. Item *SMTP Server Address* defines IP or domain address of the mail server. Username item specifies name and password specifies password to email account. Last item *Own Email Address defines* address of the sender.

The changes in settings will apply after pressing the *Apply* button.



E-mail can be send from the Startup skript. This command is used to email with following parameters.

- -t receiver Email address
- -s subject
- -m message
- -a appendix
- -r number of attempts to send email (default set 2 attempts)

Example to send email

email –t name@domain.com –s “subject“ –m “message“ –a c:\directory\abc.doc –r 5

6.20. *SMS Configuration*

In the *SMS* Configuration menu it is possible to select automatic sending of SMS messages following power up (*Send SMS on power up*) and at the start (*Send SMS on PPP connect*) or the loss (*Send SMS on PPP disconnect*) of the PPP connection and at data limit exceeded (*Send SMS when datalimit exceeded*). With switch-on parameter Send SMS when binary input on I/O port (BIN0) is active it is possible to define SMS for binary inputs in window BIN0-SMS, which will be sent if this binary input is active. With switch-on parameter Send SMS when binary input on expansion port (BIN1-BIN4) is active it is possible to define SMS for each of four binary inputs in windows BIN1-SMS, BIN2-SMS, BIN3-SMS and BIN4-SMS, which will be sent if those binary inputs are active. It is possible to send information to three telephone numbers. *Unit ID* is the name of the router that it will send an SMS message to. Unit ID may have a random form.

In the second part of the window it is possible to set function *Enable remote control via SMS*. After this it is possible to establish and close PPP connection by SMS message. This control can be configured for up to three numbers. If is set *Enable remote control via SMS,* all incoming SMS are processed and deleted. In the default settings this parameter is turned on.

If no phone number is filled in, then it is possible to restart the router with the help of SMS in the form of Reboot from any phone number. While filling of one, two or three numbers it is possible to control the router with the help of an SMS sent only from these numbers. While filling of sign “*” it is possible ro control the router with the help of an SMS sent from every numbers.

Control SMS message doesn’t change the router configuration. If the router is switched to offline mode by the SMS message the router will be in this mode up to next restart. This behaviour is the same for all control SMS messages.

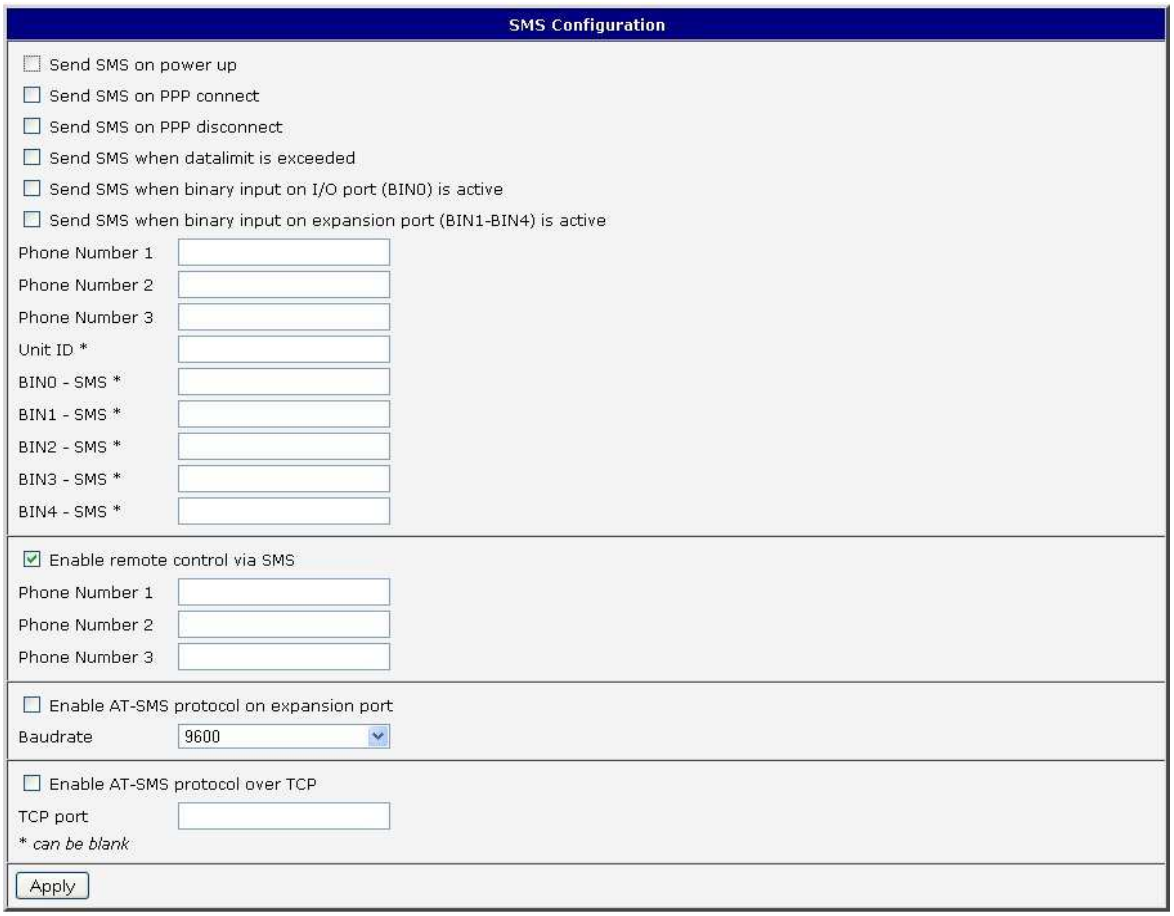
It is possible to send controls SMS in the form:

SMS	Description
go online sim 1	Switch to SIM1 card
go online sim 2	Switch to SIM2 card
go online	Switch router in online mode
go offline	PPP connection termination
set out0 0	Set I/O connector output on 0
set out0 1	Set I/O connector output on 1
set out1 0	Set expansion port XC-CNT output on 0
set out1 1	Set expansion port XC-CNT output on 1
set profile std	Set standard profile
set profile alt1	Set alternative profile 1
set profile alt2	Set alternative profile 2
set profile alt3	Set alternative profile 3
reboot	Router restart
get ip	Router send answer with IP address SIM card

By choosing *Enable AT-SMS protocol on external port* and *Baudrate* it is possible to send/receive an SMS on the serial port.

By choosing *Enable AT-SMS protocol on TCP port* and enter the *TCP port* it is possible to send/receive an SMS on the TCP port. SMS messages are sent by the help of a standard AT commands. More about the AT commands in reference **[1]**.

Choices *Enable AT-SMS protocol on external port* and *Enable AT-SMS protocol on TCP port* mustn't be chosen at the same time.


SMS Configuration
Send SMS on power up
Send SMS on PPP connect
Send SMS on PPP disconnect
Send SMS when datalimit is exceeded
Send SMS when binary input on I/O port (BIN0) is active
Send SMS when binary input on expansion port (BIN1-BIN4) is active
Phone Number 1
Phone Number 2
Phone Number 3
Unit ID *
BIN0 - SMS *
BIN1 - SMS *
BIN2 - SMS *
BIN3 - SMS *
BIN4 - SMS *
Enable remote control via SMS
Phone Number 1
Phone Number 2
Phone Number 3
Enable AT-SMS protocol on expansion port
Baudrate
9600
Enable AT-SMS protocol over TCP
TCP port
* can be blank
Apply

After powering up the router, at introduction of the telephone number comes SMS in the form of:

ER75i v2(Unit ID) has been powered up. PLMN:xxxxx,Cell:xxxx,Channel:xx,Level:-xxdBm.

Where PLMN is – number of mobile operator, Cell – number of cell, Channel – used channel, Level – level signal

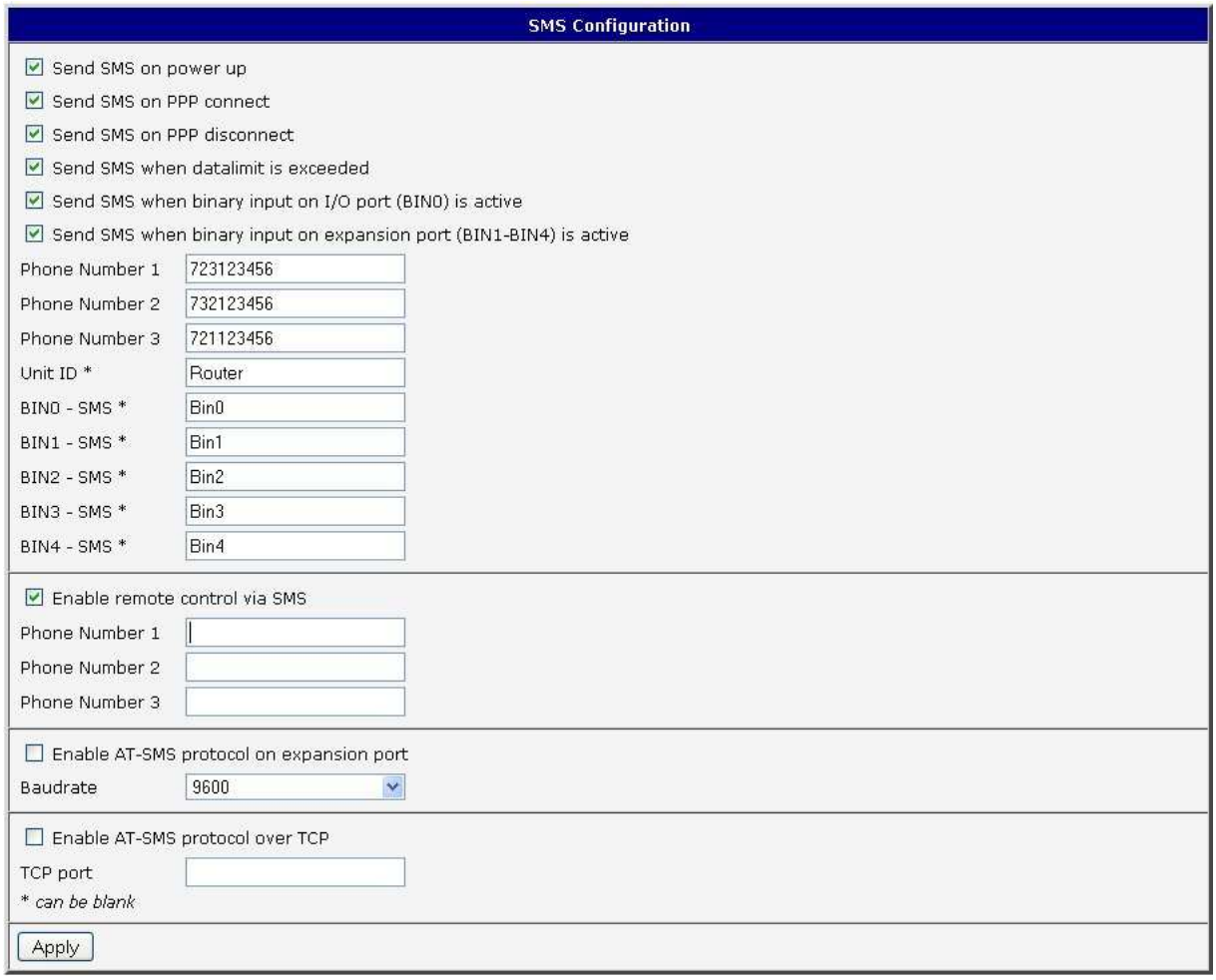
After PPP connect, at introduction of the telephone number comes SMS in the form:

ER75i v2 (Unit ID) has established PPP connection. IP address xxx.xxx.xxx.xxx

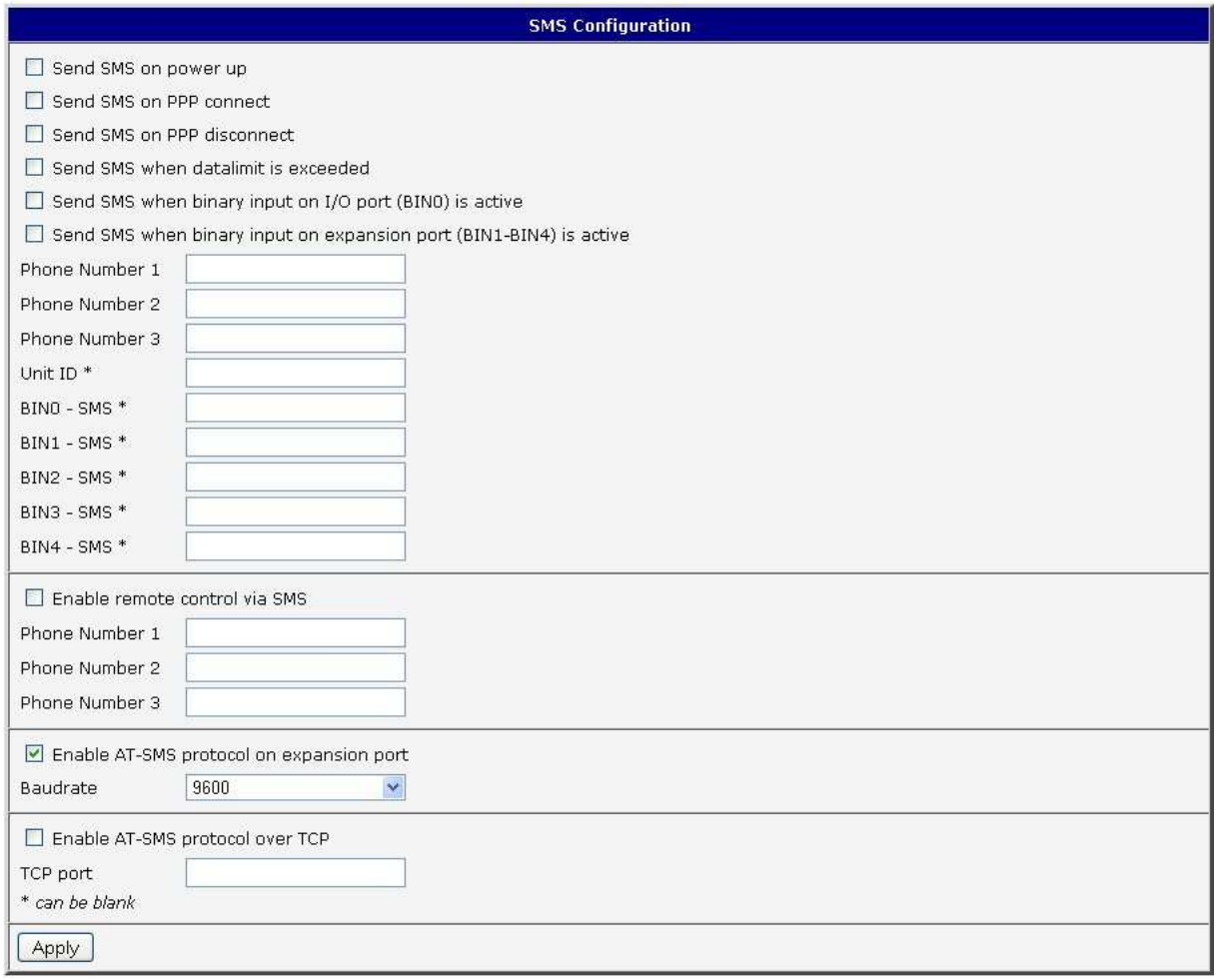
After PPP disconnect, at introduction of the telephone number comes SMS in the form:

ER75i v2 (Unit ID) has lost PPP connection. IP address xxx.xxx.xxx.xxx

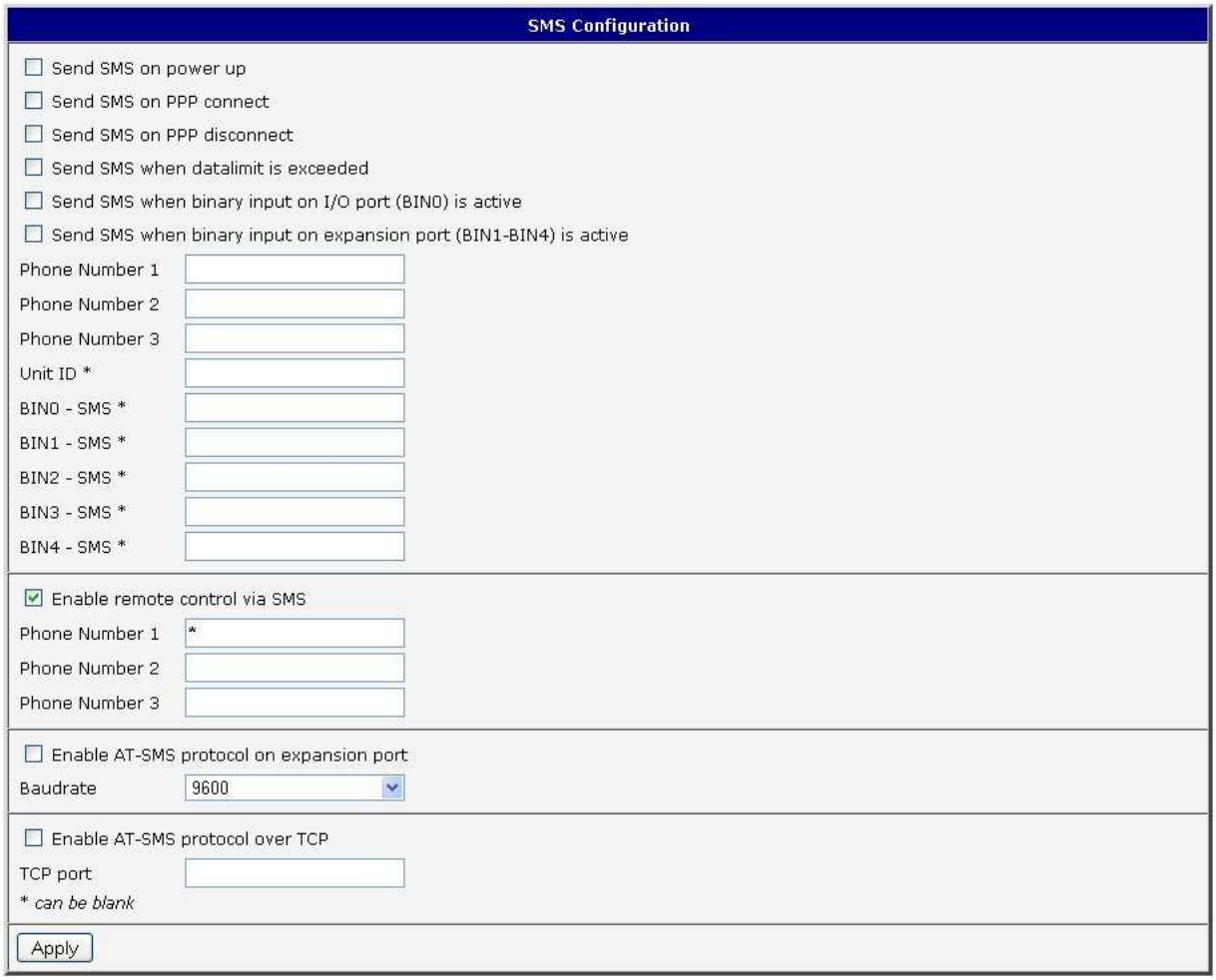
Configuration of sending this SMS is following:


SMS Configuration
Send SMS on power up
Send SMS on PPP connect
Send SMS on PPP disconnect
Send SMS when datalimit is exceeded
Send SMS when binary input on I/O port (BIN0) is active
Send SMS when binary input on expansion port (BIN1-BIN4) is active
Phone Number 1 723123456
Phone Number 2 732123456
Phone Number 3 721123456
Unit ID * Router
BIN0 - SMS * Bin0
BIN1 - SMS * Bin1
BIN2 - SMS * Bin2
BIN3 - SMS * Bin3
BIN4 - SMS * Bin4
Enable remote control via SMS
Phone Number 1
Phone Number 2
Phone Number 3
Enable AT-SMS protocol on expansion port
Baudrate 9600
Enable AT-SMS protocol over TCP
TCP port
* can be blank
Apply

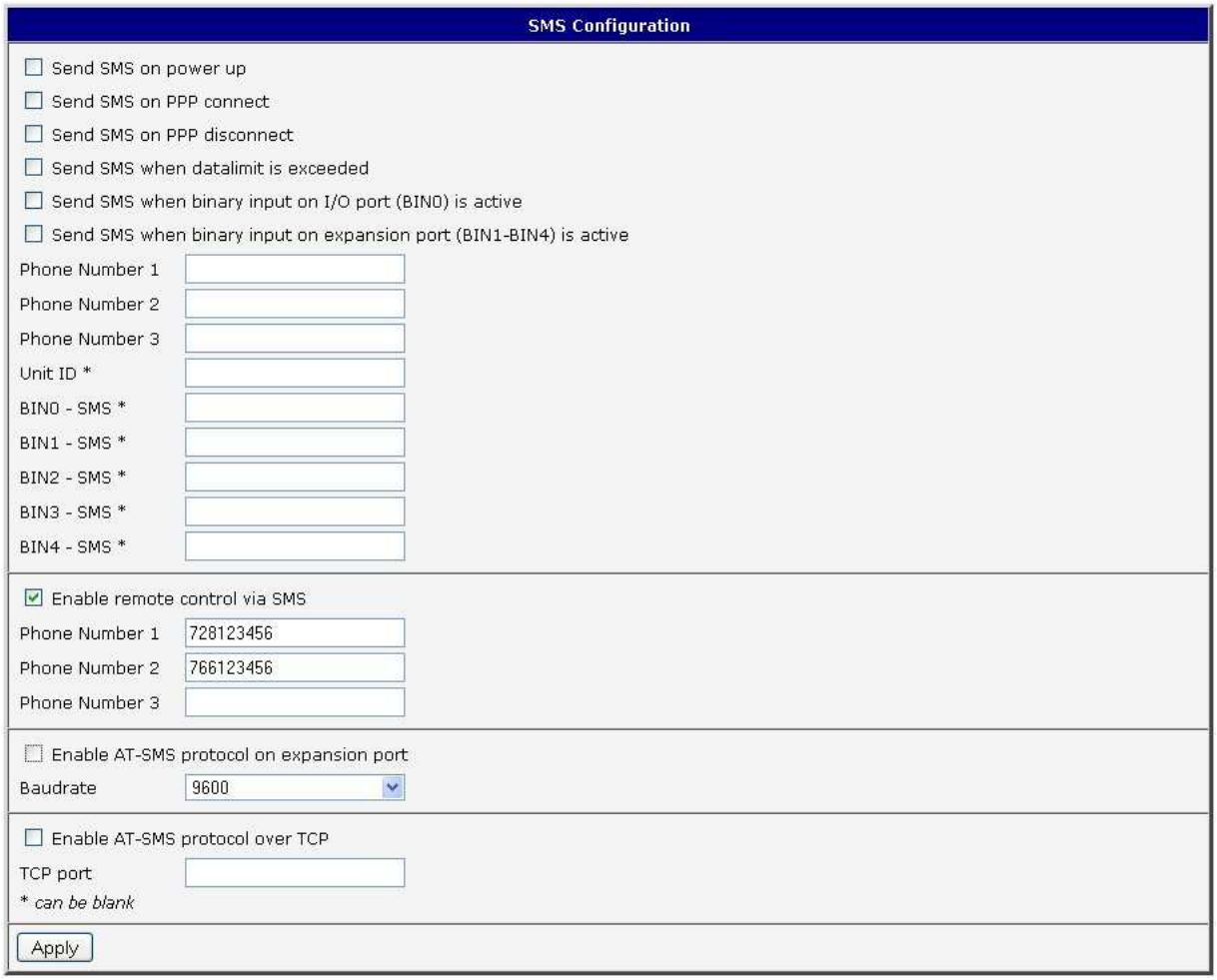
Example of the router configuration for SMS sending via serial interface:


SMS Configuration
Send SMS on power up
Send SMS on PPP connect
Send SMS on PPP disconnect
Send SMS when datalimit is exceeded
Send SMS when binary input on I/O port (BIN0) is active
Send SMS when binary input on expansion port (BIN1-BIN4) is active
Phone Number 1
Phone Number 2
Phone Number 3
Unit ID *
BIN0 - SMS *
BIN1 - SMS *
BIN2 - SMS *
BIN3 - SMS *
BIN4 - SMS *
Enable remote control via SMS
Phone Number 1
Phone Number 2
Phone Number 3
Enable AT-SMS protocol on expansion port
Baudrate
9600
Enable AT-SMS protocol over TCP
TCP port
* can be blank
Apply

Example of the router configuration for controlling via SMS from every phone numbers:


SMS Configuration
Send SMS on power up
Send SMS on PPP connect
Send SMS on PPP disconnect
Send SMS when datalimit is exceeded
Send SMS when binary input on I/O port (BIN0) is active
Send SMS when binary input on expansion port (BIN1-BIN4) is active
Phone Number 1
Phone Number 2
Phone Number 3
Unit ID *
BIN0 - SMS *
BIN1 - SMS *
BIN2 - SMS *
BIN3 - SMS *
BIN4 - SMS *
Enable remote control via SMS
Phone Number 1
*
Phone Number 2
Phone Number 3
Enable AT-SMS protocol on expansion port
Baudrate
9600
Enable AT-SMS protocol over TCP
TCP port
* can be blank
Apply

Example of the router configuration for controlling via SMS from two phone numbers:


SMS Configuration
Send SMS on power up
Send SMS on PPP connect
Send SMS on PPP disconnect
Send SMS when datalimit is exceeded
Send SMS when binary input on I/O port (BIN0) is active
Send SMS when binary input on expansion port (BIN1-BIN4) is active
Phone Number 1
Phone Number 2
Phone Number 3
Unit ID *
BIN0 - SMS *
BIN1 - SMS *
BIN2 - SMS *
BIN3 - SMS *
BIN4 - SMS *
Enable remote control via SMS
Phone Number 1 728123456
Phone Number 2 766123456
Phone Number 3
Enable AT-SMS protocol on expansion port
Baudrate 9600
Enable AT-SMS protocol over TCP
TCP port
* can be blank
Apply

The SMS is possible to do for example in HyperTerminal program. After establishing connection with the router via serial interface or Ethernet, it is possible to do with SMS by the help of the next AT commands (more about AT commands see reference **[1]**):

AT commands	Description
AT+CMGF=1	Set the text mode for SMS writing
AT+CMGS=”tel. number”	Commands enables to send SMS on entered tel. number
AT+CMGL=ALL	List of all SMS messages
AT+CMGR=<index>	Read of the definite SMS (all SMS has our index)
AT+CMGD=<index>	SMS delete according to index

For the text mode for SMS writing is used command *AT+CMGF=1*.

AT+CMGF=1 Enter

OK

The SMS message is created by the help of command *AT+CMGS=<tel. number>*. After *Enter* button is pressed is displayed mark >, behind this mark it is possible to write your own SMS message. The SMS message is sent by the help of *CTRL+Z* (SMS sending takes a few minutes). SMS writing is possible to cancel by pressing *Esc*.

AT+CMGS="712123456" Enter

>***Hello World!*** CTRL+Z (keys combination)

OK

It is possible to find the new SMS by the help of command *AT+CMGL=ALL*. This command reproaches all SMS messages.

AT+CMGL=ALL Enter

+CMGL: <index>, <status>,<sender number>, ,<date>,<time>
SMS text.

+CMGL: 1,"REC UNREAD","+420721123456", ,"08/02/02, 10:33:26+04"
Hello World!

where <index> is ordinal number of the SMS,

<status> is SMS status:

REC UNREAD – SMS unread
REC READ – SMS read
STO UNSENT – stored unsent SMS
STO SENT – stored sent SMS
ALL – all SMS messages

<sender number> is tel. number from which the SMS was receive,

<date> is date of SMS received,

<time> is time of SMS received.

It is possible to read the new SMS message by command AT+CMGR=<index>.

AT+CMGR=1 Enter

+CMGL: <index>, <status>,<sender number>, ,<date>,<time>
SMS text.

+CMGL: 1,"REC READ","+420721123456", ,"08/01/12, 9:48:04+04"
Hello World!

Received SMS is possible to delete by command AT+CMGD=<index>.

AT+CMGD=1 Enter

OK

6.21. *Expansion Port Configuration*

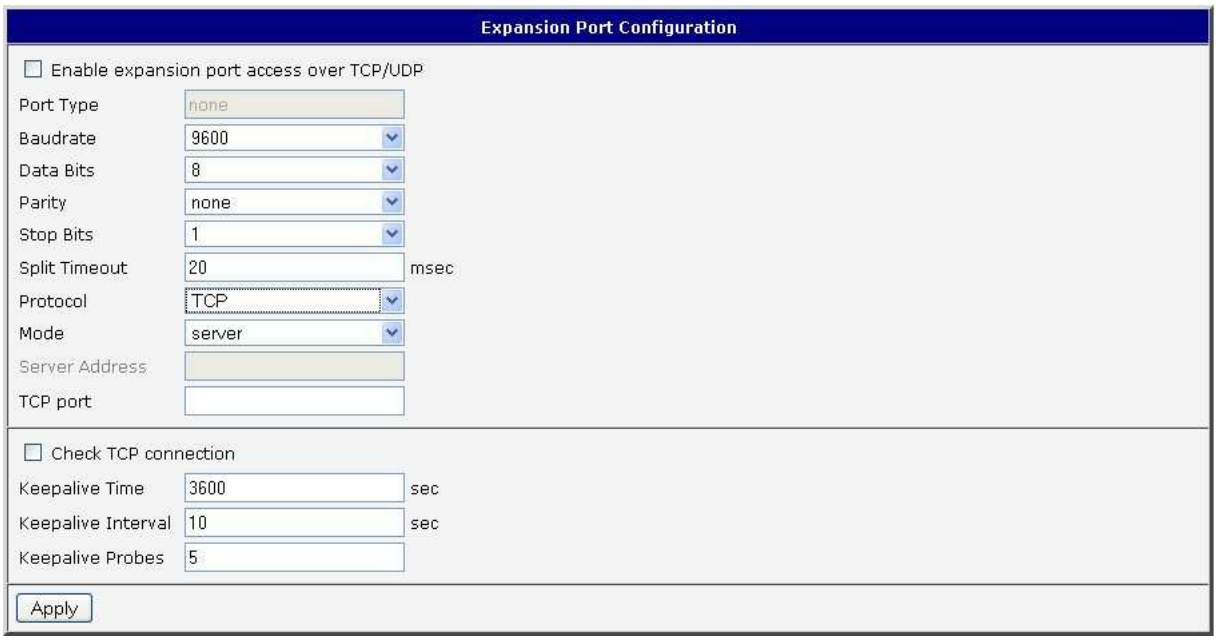
The expansion port configuration can be called up by airbrush option External Port in menu. Inside the window can be defined *Baudrate*, number of *Data bits*, *Parity*, number of *Stop bits*, *Protocol* and *Mode*. *Split timeout* is for messages.

In mode *TCP server* it is necessary to enter the *TCP port*, on which the router will listen to incoming requests about TCP connection. In mode *TCP client* it is necessary to enter the *Server address* and final *TCP port*.

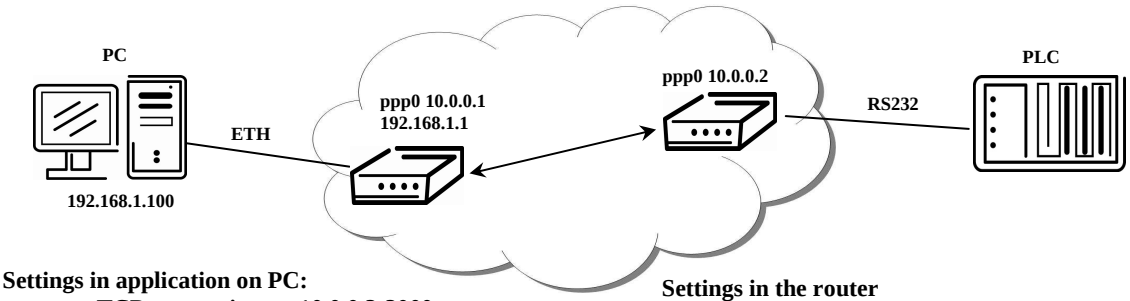
At *Check TCP connection* it activates verification of coupled TCP connection. Inside the window can be defined time, after which it will carry out verification of the connection (*Keepalive Time*), waiting time on answer (*Keepalive Interval*) and number of tests (*Keepalive Probes*).

In case of M-BUS expansion board installed and when chosen protocol is not M-BUS or M-BUS TCP then sent data will be returned back to the device! If e.g. LINE protocol is set-up on this port, then data will return back to the source.

The changes in settings will apply after pressing the *Apply* button.



Example of external port configuration:

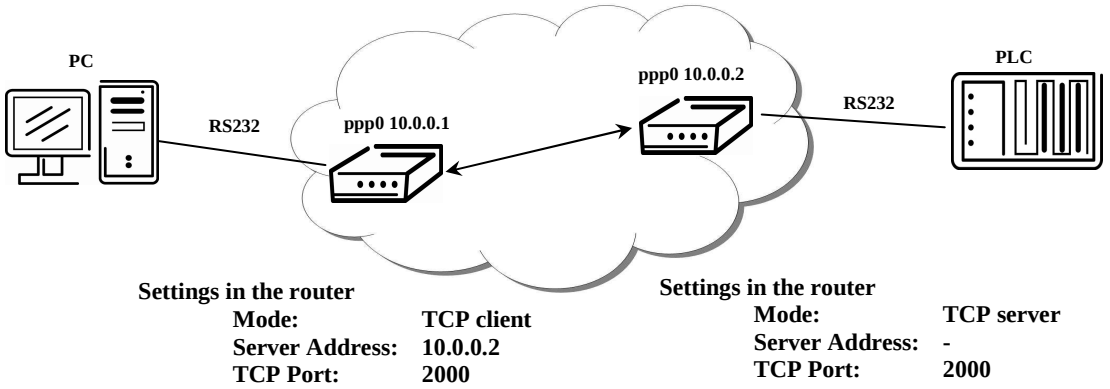


Settings in application on PC:
TCP connection on 10.0.0.2:2000

Default Gateway 192.168.1.1

Settings in the router

Mode:	**TCP server**
Server Address:	**-**
TCP Port:	**2000**



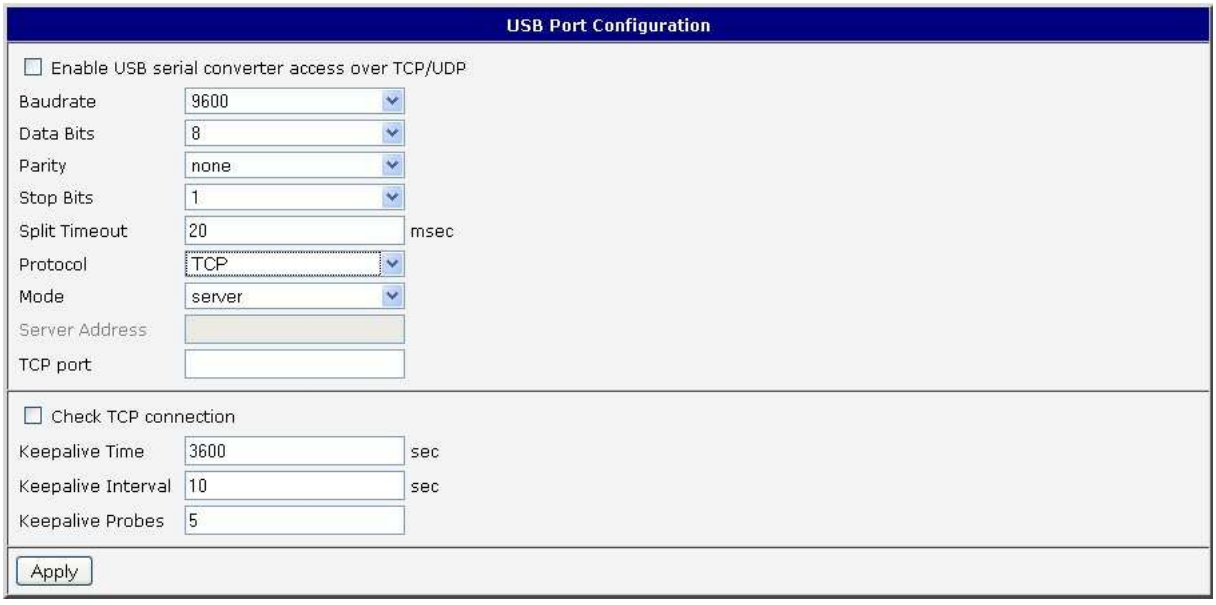
6.22. *USB Port Configuration*

The USB port configuration can be called up by airbrush option *USB Port* in menu. Inside the window can be defined *Baudrate*, number of *Data bits*, *Parity*, number of *Stop bits*, *Protocol* and *Mode*. *Split timeout* is for messages.

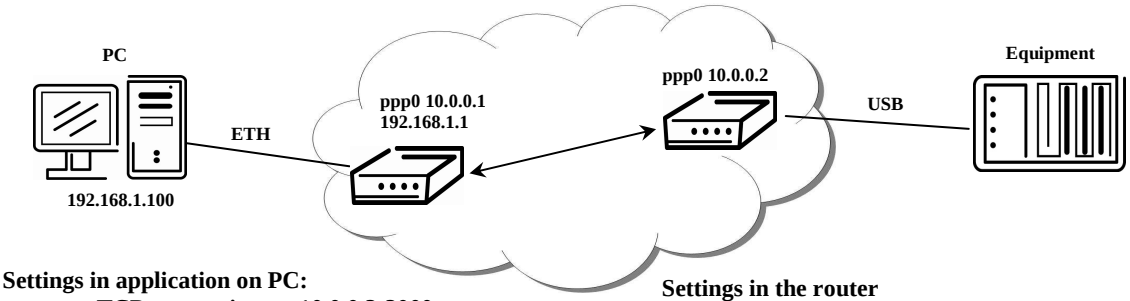
In mode *TCP server* it is necessary to enter the *TCP port*, on which the router will listen to incoming requests about TCP connection. In mode *TCP client* it is necessary to enter the *Server address* and final *TCP port*.

At *Check TCP connection* it activates verification of coupled TCP connection. Inside the window can be defined time, after which it will carry out verification of the connection (*Keepalive Time*), waiting time on answer (*Keepalive Interval*) and number of tests (*Keepalive Probes*).

The changes in settings will apply after pressing the *Apply* button



Example of USB port configuration:

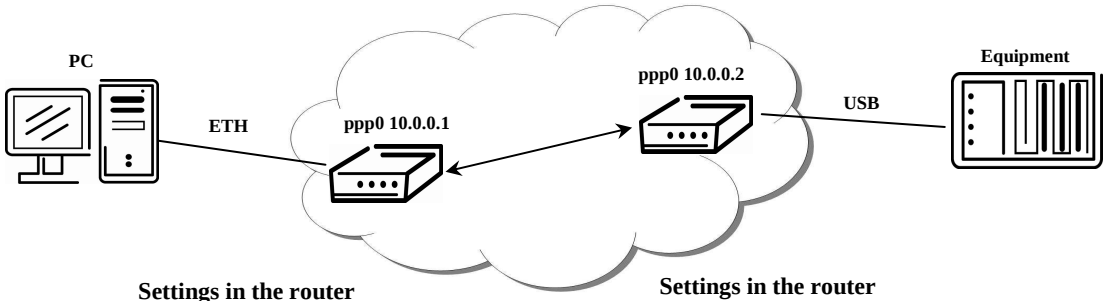


Settings in application on PC:
TCP connection on 10.0.0.2:2000

Default Gateway 192.168.1.1

Settings in the router

Mode:	**TCP server**
Server Address:	**-**
TCP Port:	**2000**



Settings in the router

Mode:	**TCP client**
Server Address:	**10.0.0.2**
TCP Port:	**2000**

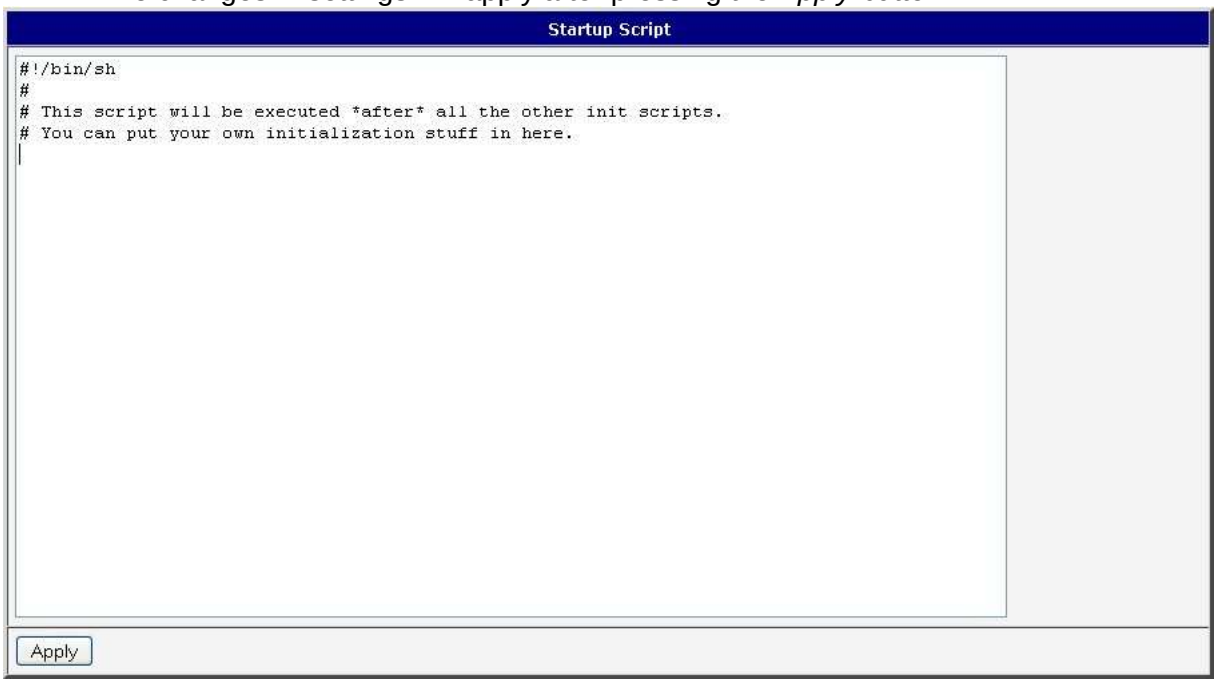
Settings in the router

Mode:	**TCP server**
Server Address:	**-**
TCP Port:	**2000**

6.23. *Startup Script*

In the window S*tartup Script* it is possible to create own scripts which will be executed after all initial scripts. This script is not stored or restored when using web interface backup or restores option.

The changes in settings will apply after pressing the *Apply* button.

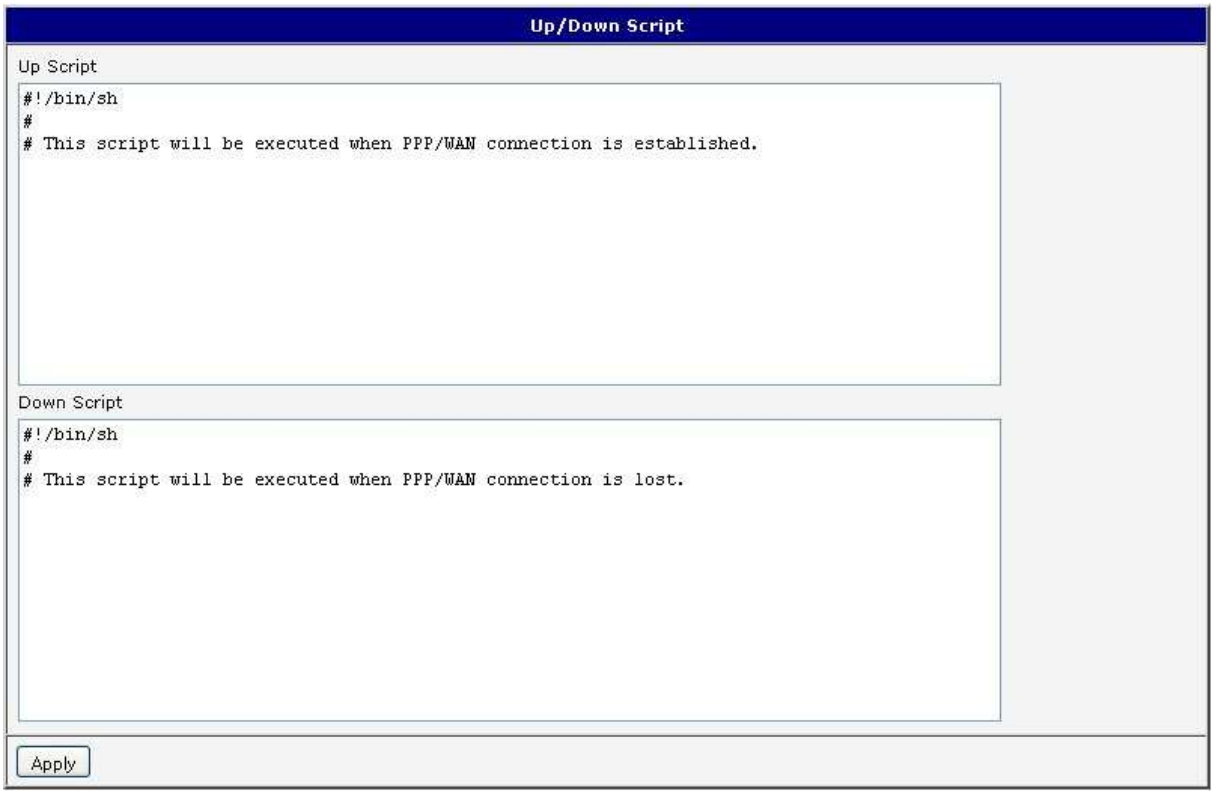

Startup Script
#!/bin/sh
#
This script will be executed *after* all the other init scripts.
You can put your own initialization stuff in here.
Apply

Change take effect after restarting router by the help of button *Reboot* in web administration or by SMS message.

6.24. *Up/Down Script*

In the window *Up/Down Script* it is possible to create own scripts. In the item *Up script* is defined scripts, which begins after establishing a PPP connection. In the item *Down Script* is defines script, which begins after lost a PPP connection. This script is not stored or restored when using web interface backup or restores option.

The changes in settings will apply after pressing the *Apply* button.



Change take effect after restarting router by the help of button *Reboot* in web administration or by SMS message.

6.25. *Automatic update configuration*

In the window *Automatic update* it is possible to set automatic configuration update. This choice enables that the router automatically downloads the configuration and the newest firmware from the server itself. The configuration and firmware are stores on the server.

By *Enable automatic update of configuration* it is possible to enable automatic configuration update and by *Enable automatic update of firmware* it is possible to enable firmware update.

In the item source can be set, where new firmware download. If *HTTP / FTP server* selected, new firmware look at address in the Base URL item. If is selected *USB flash drive*, router finds current firmware in the root directory of the connected USB device. If *Both* is selected router is looking for the newest firmware from both sources.

By parameter *Base URL* it is possible to enter base part of the domain or IP address, from which the configuration file will be downloaded. In the case that *Unit ID* is empty, the contents of parameter *Unite ID* or MAC address is added to *Base URL*.

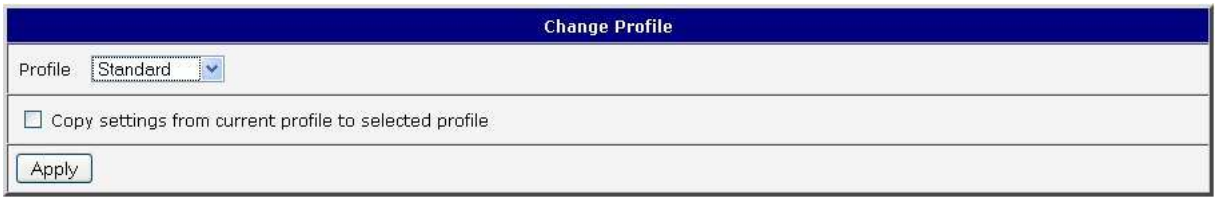
The configuration file name is from parameter *Base URL*, hardware MAC address of ETH0 interface and *cfg* extension. Hardware MAC address and *cfg* extension is connected automatically and it isn't needed to enter this. By parameter *Unit ID* enabled it defines the concrete configuration name which will be download to the router. When using parameter *Unit ID*, hardware MAC address in configuration name will not be used.

Automatic configuration update starts 5 minutes after turning on the router and then every 24 hours or it is possible to set the time of automatic configuration in parameter *Update Hour.* If the entered URL is different configuration than in the router then the router downloads this configuration and restarts itself.

The changes in settings will apply after pressing the *Apply* button.

6.26. *Change profile*

To open the dialog box for changing profile select the *Change Profile* menu item. Profile switch is making by press the button *Apply*. Change take effect after restarting router by the help of button *Reboot* in web administration or by SMS message. It is possible select the standard profile or up to three alternative profiles. It is possible to copy actual configuration to selected configuration by selecting *Copy settings from current profile to selected profile*.



6.27. *Change password*

To open the dialog box for changing the access password select the *Change Password* menu item. The new password will be saved after pressing the *Apply* button.

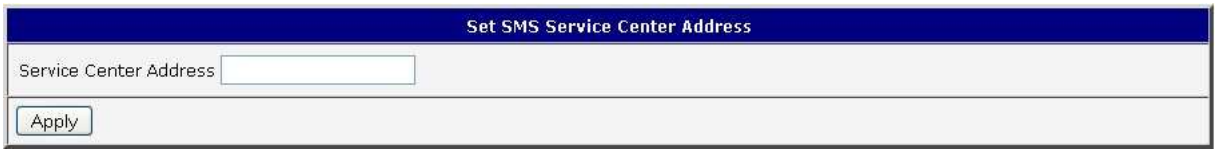
In basic settings of the router the password is set on default form *root*. For higher security of your network we recommend changing this password.

6.28. *Set real time clock*

One - shot inner clock of the router setting can be called up in option *Set Real Time Clock item* in the menu. Clocks are set according to the engaged NTP server after push-button operation *Apply.*

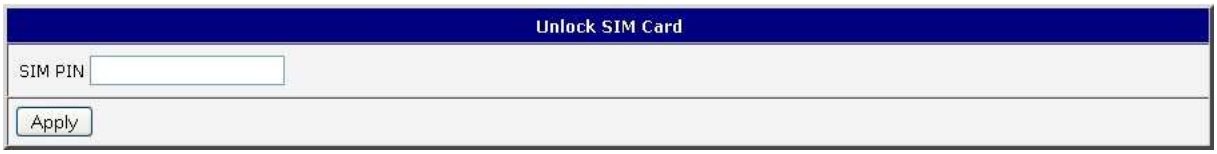
6.29. *Set SMS service center address*

In some cases it is needed to set the phone number of the SMS service centre because of SMS sending. This parameter can not be set when the SIM card has set phone number of the SMS service centre. The phone number can be formed without international prefix xxx xxx xxx or with international prefix for example +420 xxx xxx xxx.



6.30. *Unlock SIM card*

Possibility to unlock SIM PIN is under *Unlock SIM Card* item. If the inserted SIM card is secured by a PIN number, enter the PIN to field *SIM PIN* and push-button *Apply*.



6.31. *Send SMS*

Sending SMS messages is possible in menu *Send SMS*. The SMS message will be sent after entering the *Phone number* and text SMS (*Message*) and by pushing button *Send.*

SMS message sending via HTTP request is in the form:

GET /send_exec.cgi?phone=%2B**420712345678**&message=**Test** HTTP/1.1
Authorization: Basic cm9vdDpyb290

HTTP request will be sent to TCP connection on router port 80 which sends an SMS message *Test* to phone number *420712345678*. Authorization is in the format "user:password" coded by BASE64, example is for root:root.

6.32. *Backup Configuration*

The router configuration is possible to save by help of the *Backup Configuration* menu item. After clicking on this menu it is possible to check a destination directory, where it will save the router configuration.

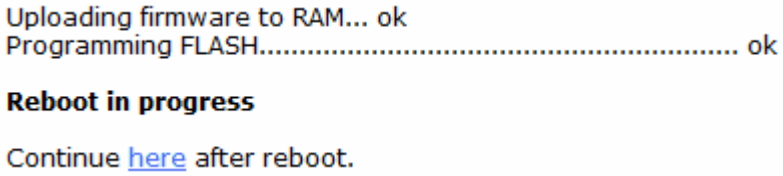
6.33. *Restore Configuration*

In case it is needed to restore the router configuration, it is possible in *Restore Configuration* menu item to check configuration by help *Browse* button.

6.34. *Update firmware*

To view the information about the firmware version and instructions for its update select the *Update Firmware* menu item. The new firmware will be checked after pressing *Browse* button and update the following pressing the Update button.

After successful firmware updating the following statement is listed:



There is information about updating of the FLASH memory.

By firmware actualization from 1.0.5 version the router configuration is remains include IP address. By actualization older firmware than 1.0.5 the IP address will be set on 192.168.1.1 and all values are in defaults state. From firmware version 2.0.3 is provided simply file name check of new firmware file. Upload firmware of different device can cause damage of the router! Total update time lasts for 3 - 4 minutes. During updating of the firmware permanent power supply has to be maintained. We strongly recommend not using distant update because of blackout GPRS connection.

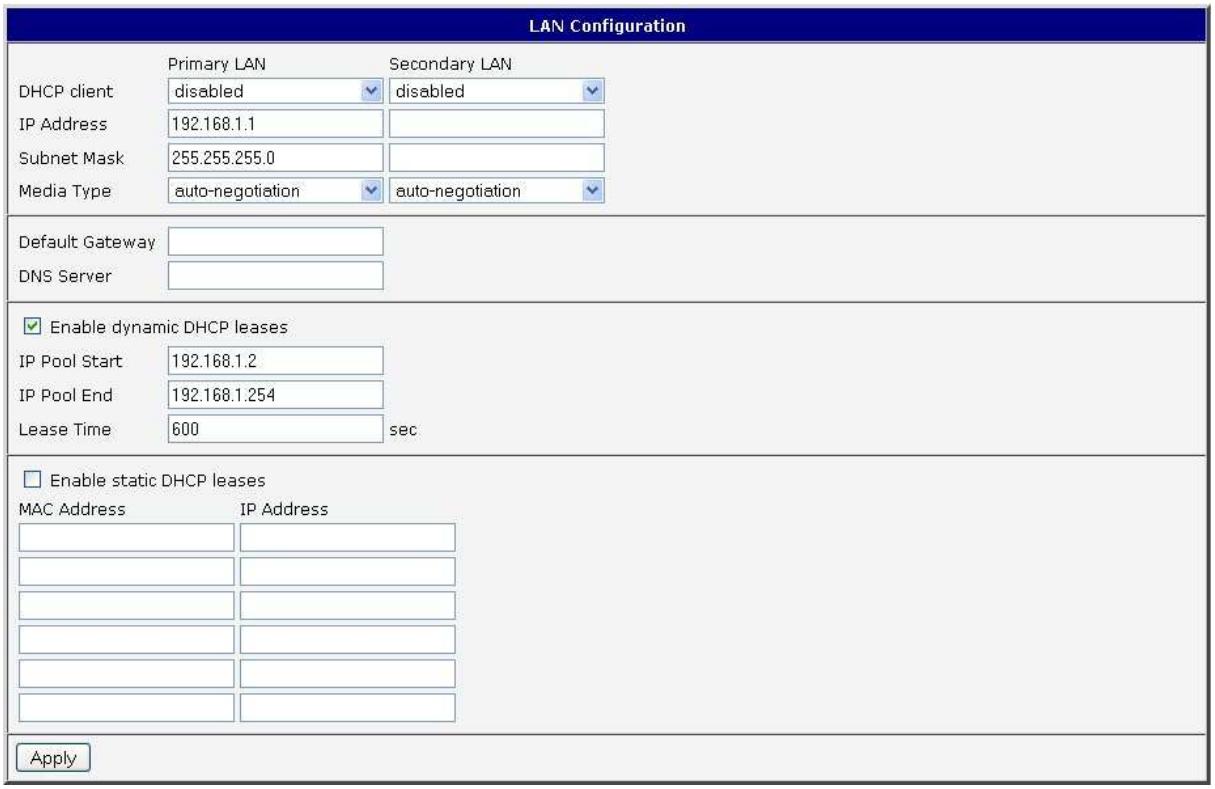
6.35. *Reboot*

To reboot the router select the *Reboot* menu item and then press the *Reboot* button.

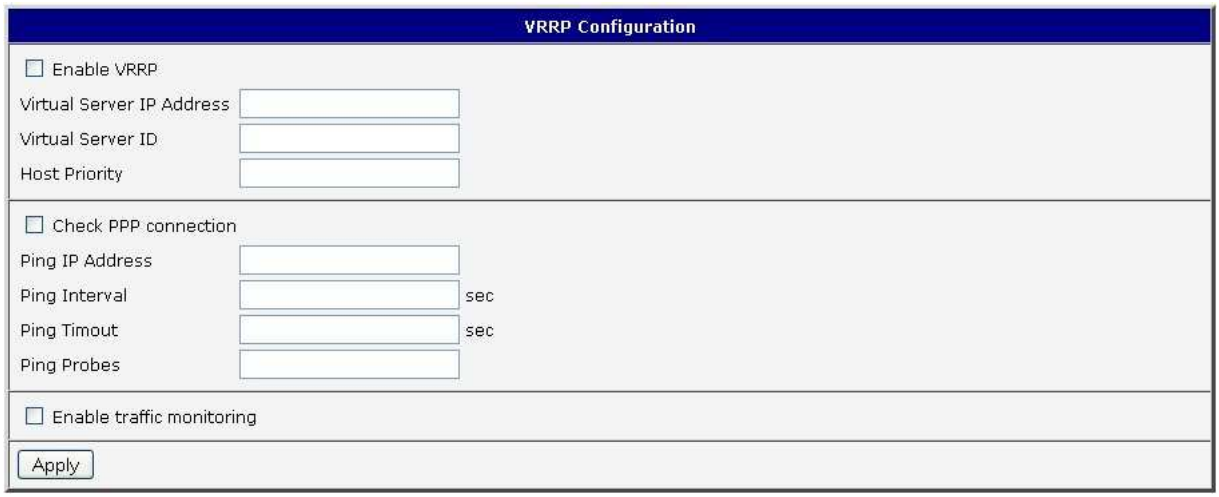
6.36. *Default settings*

After green LED starts to blink it is possible to restore initial settings of the router by pressing button RST on front panel. After press button RST it is restoration of the configuration and reset (green LED will be on).

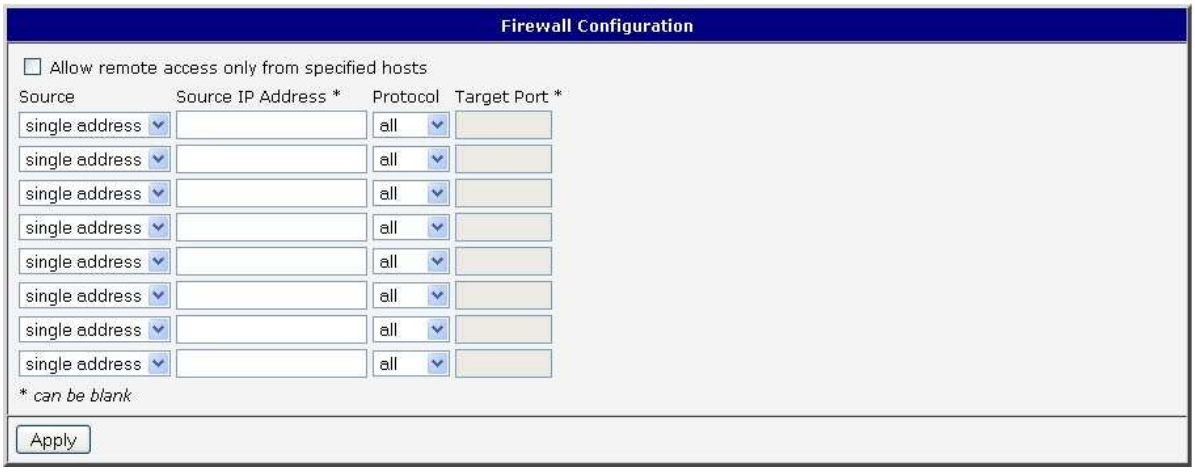
6.36.1. LAN Configuration



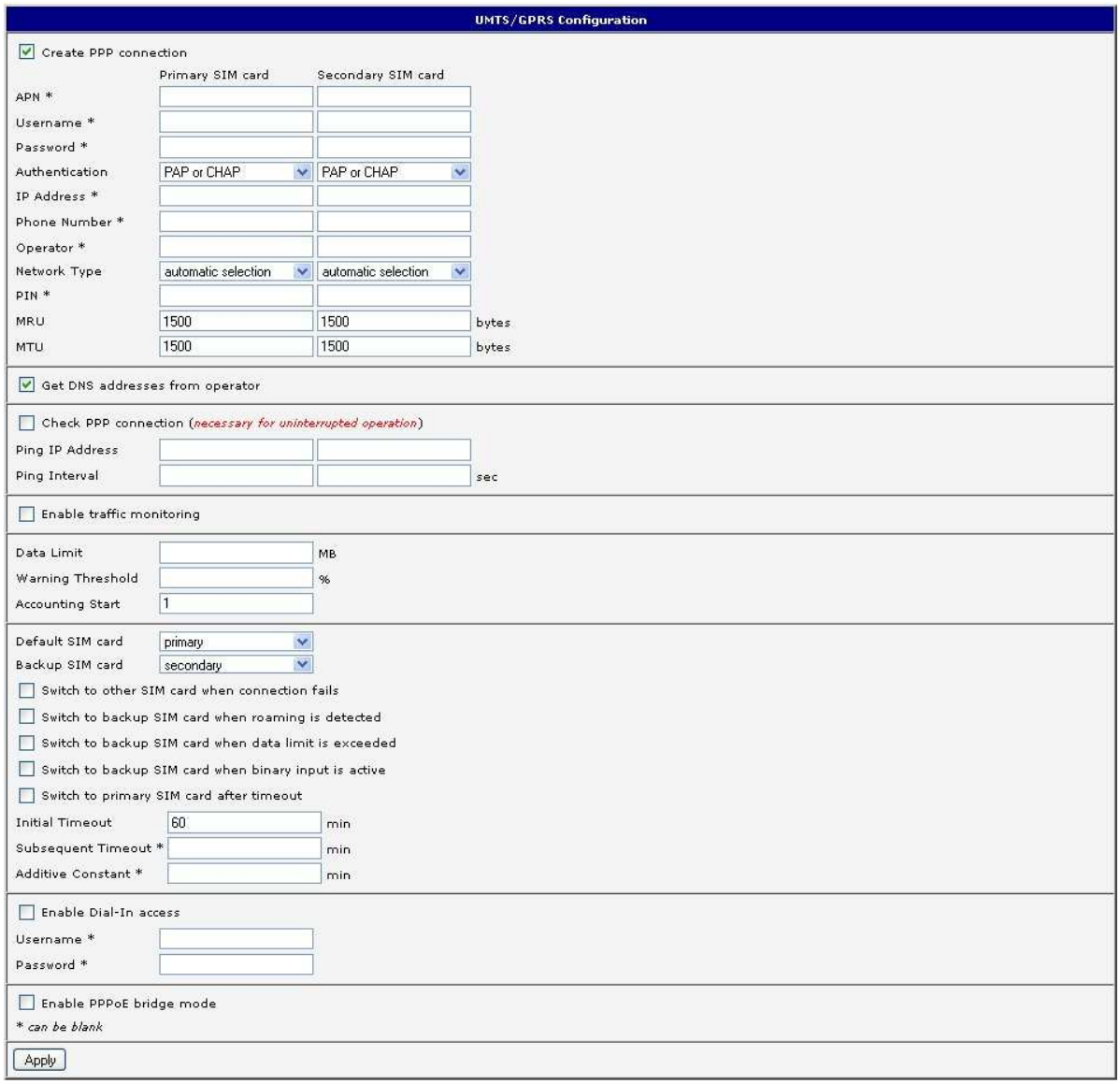
6.36.2. VRRP Configuration



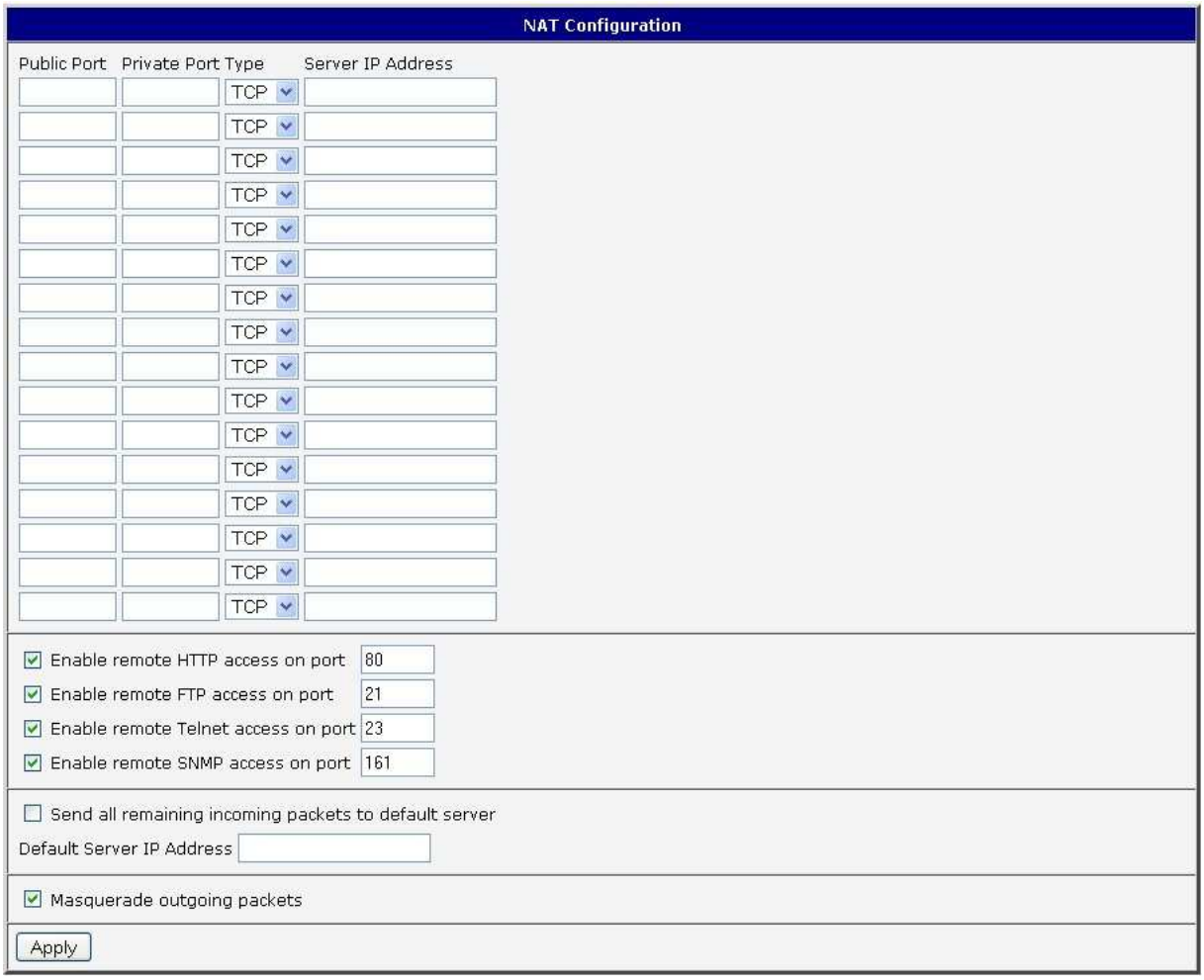
6.36.3. Firewall Configuration



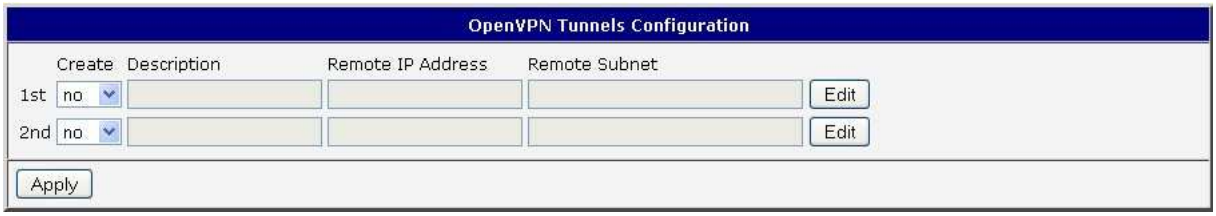
6.36.4. GPRS Configuration

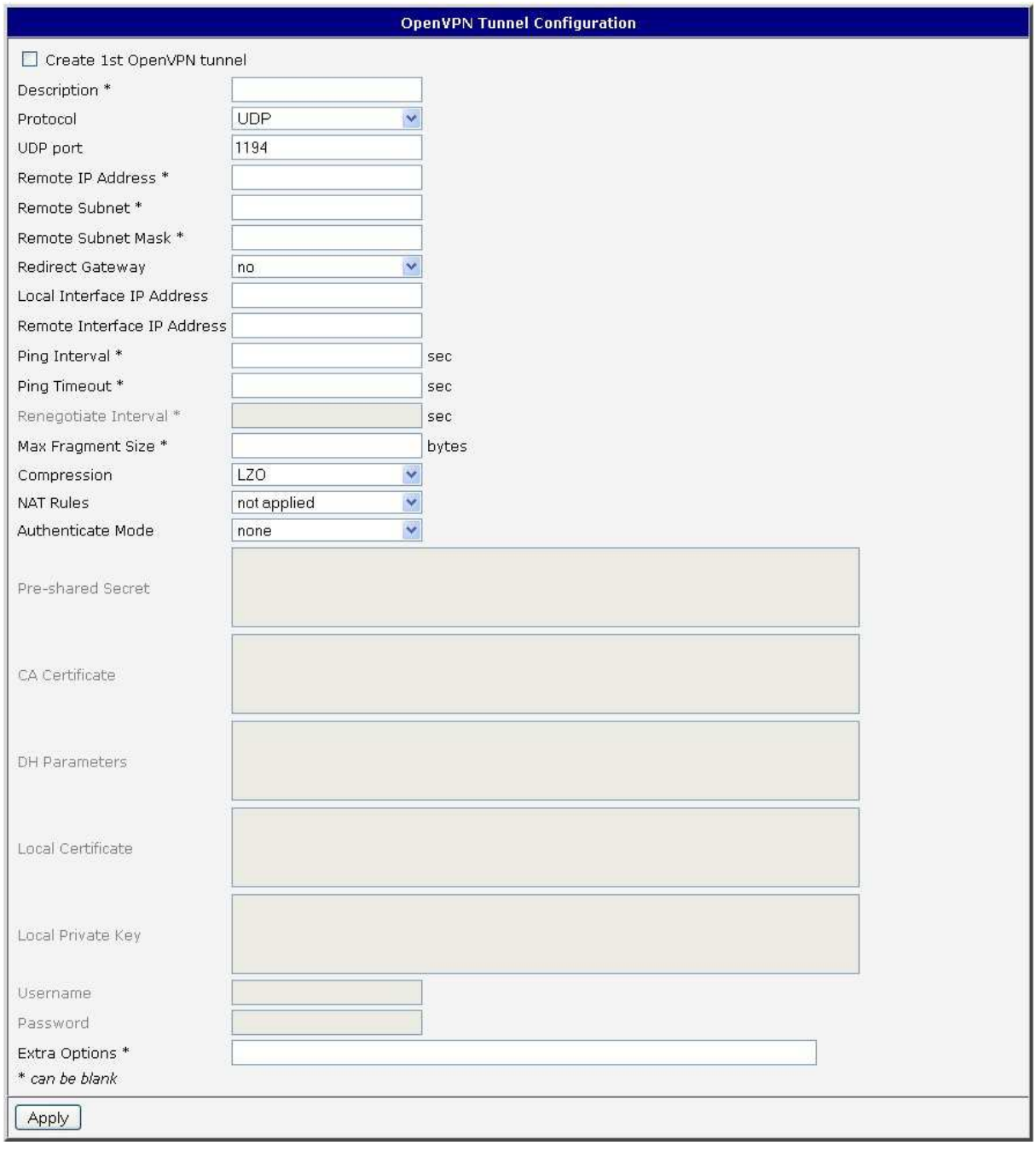


6.36.5. NAT Configuration

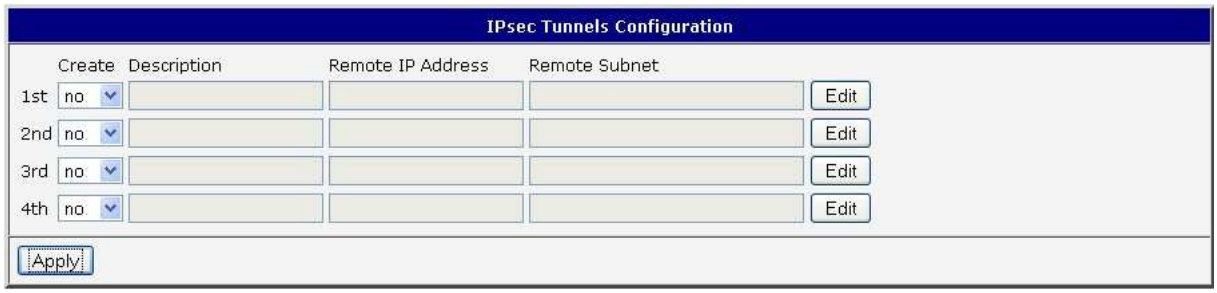


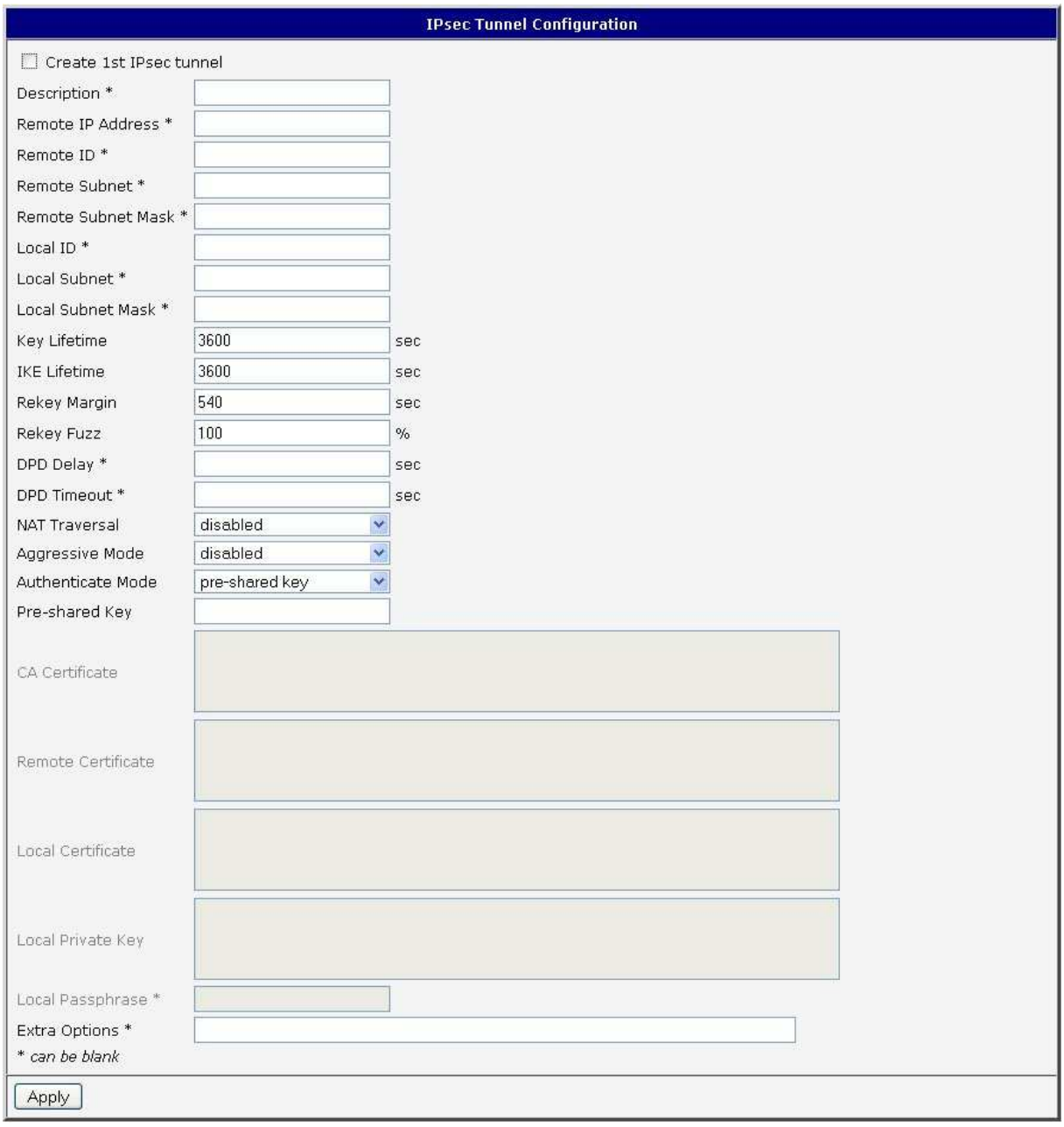
6.36.6. OpenVPN Tunnel Configuration



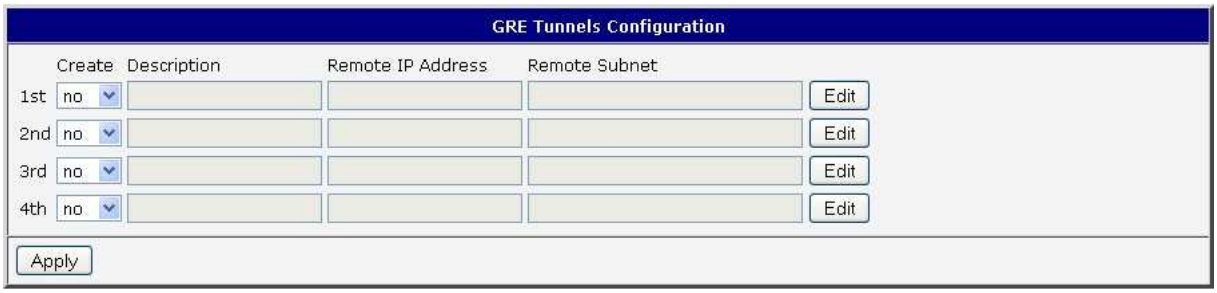


6.36.7. IPsec Tunnel Configuration



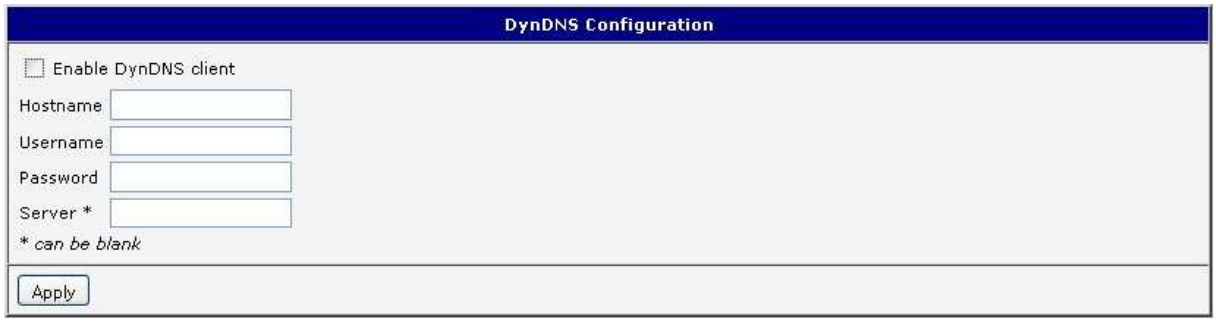


6.36.8. GRE Tunnels Configuration

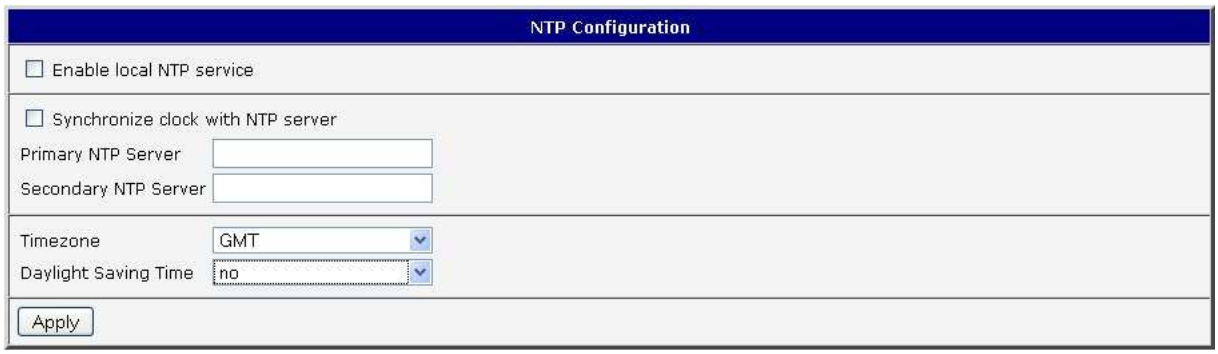


6.36.9. L2TP Tunnel Configuration

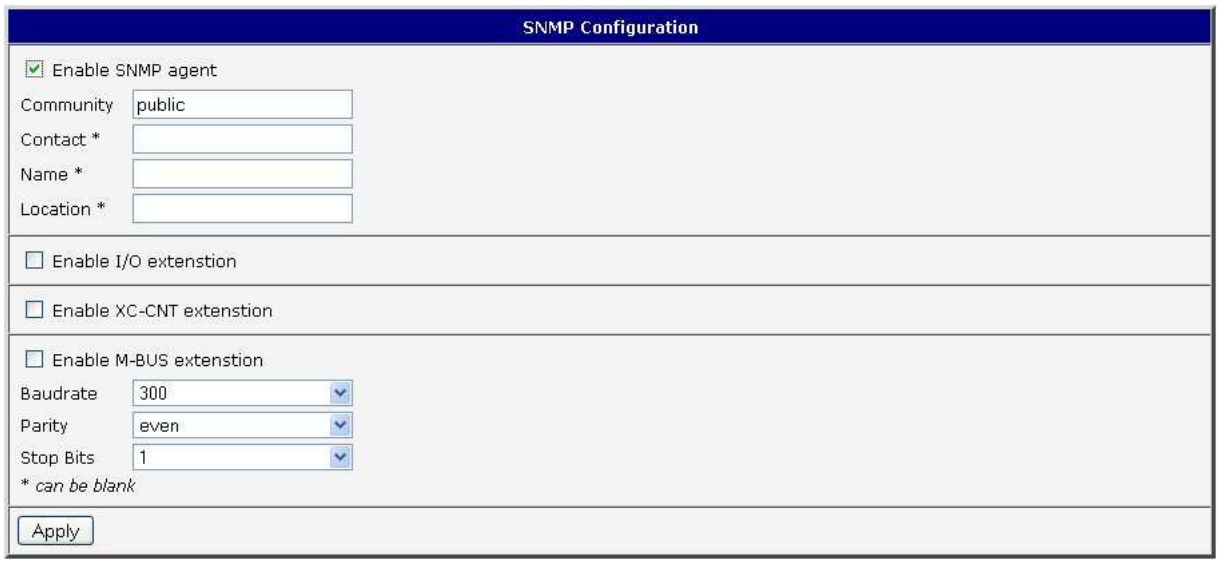
6.36.10. DynDNS Configuration



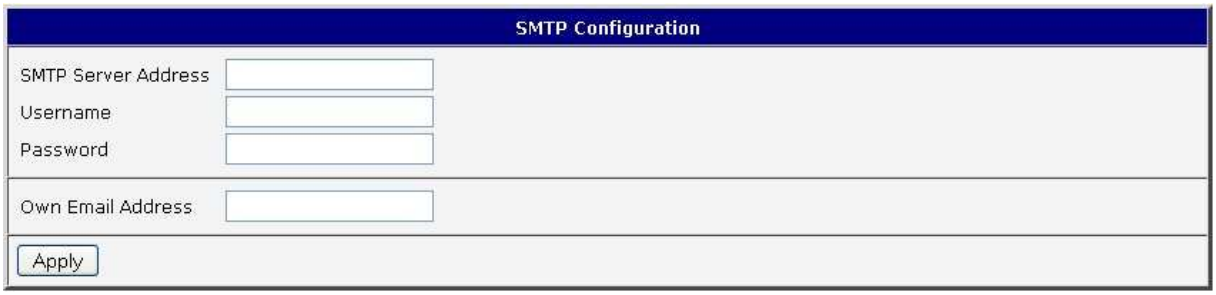
6.36.11. NTP Configuration



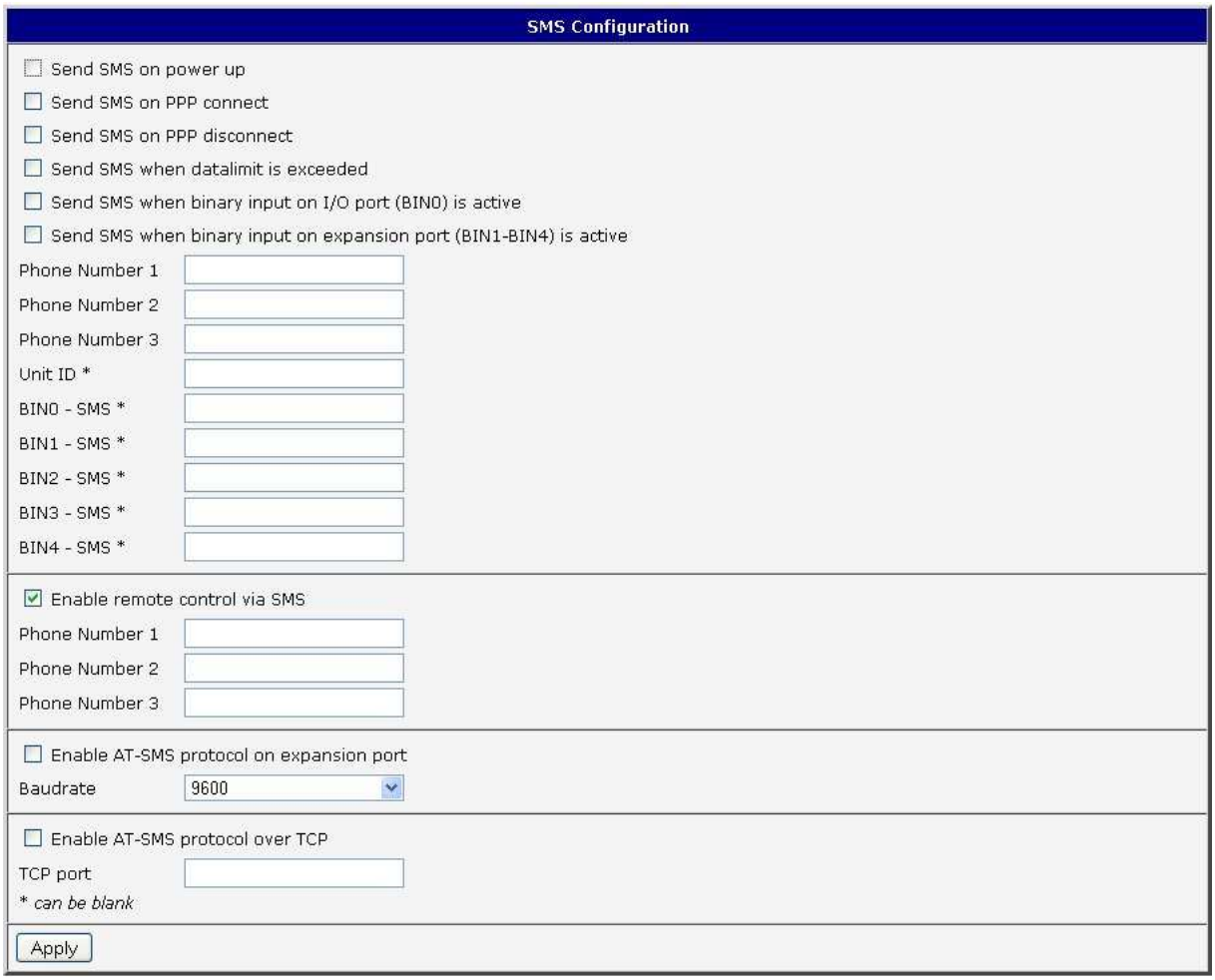
6.36.12. SNMP Configuration



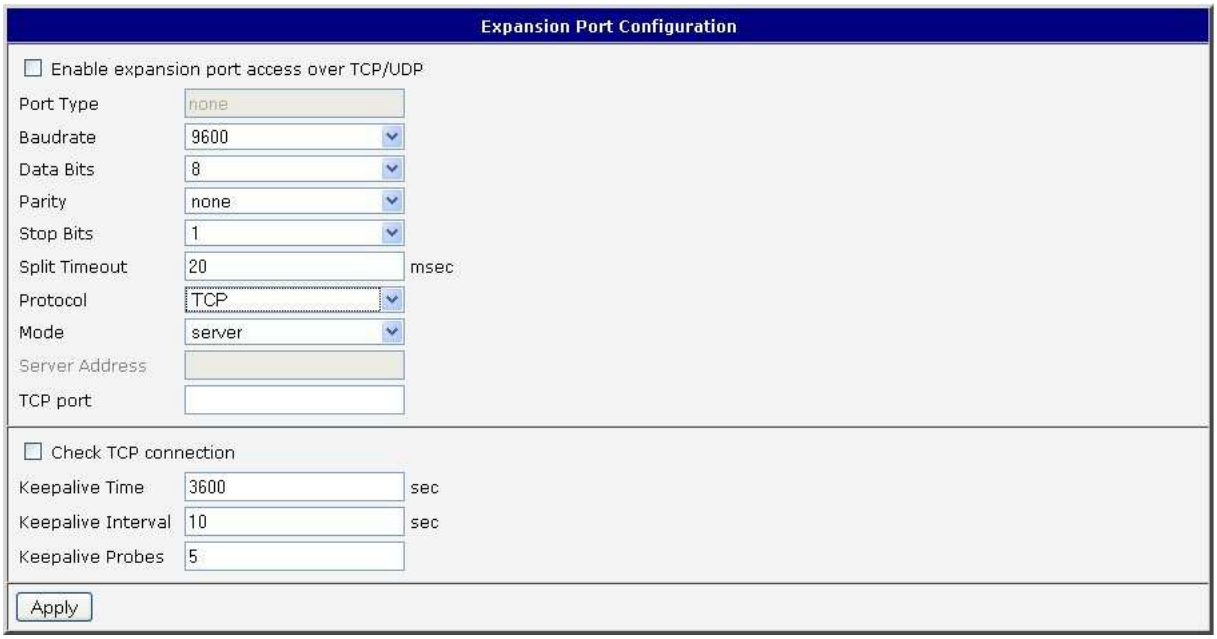
6.36.13. SMTP Configuration



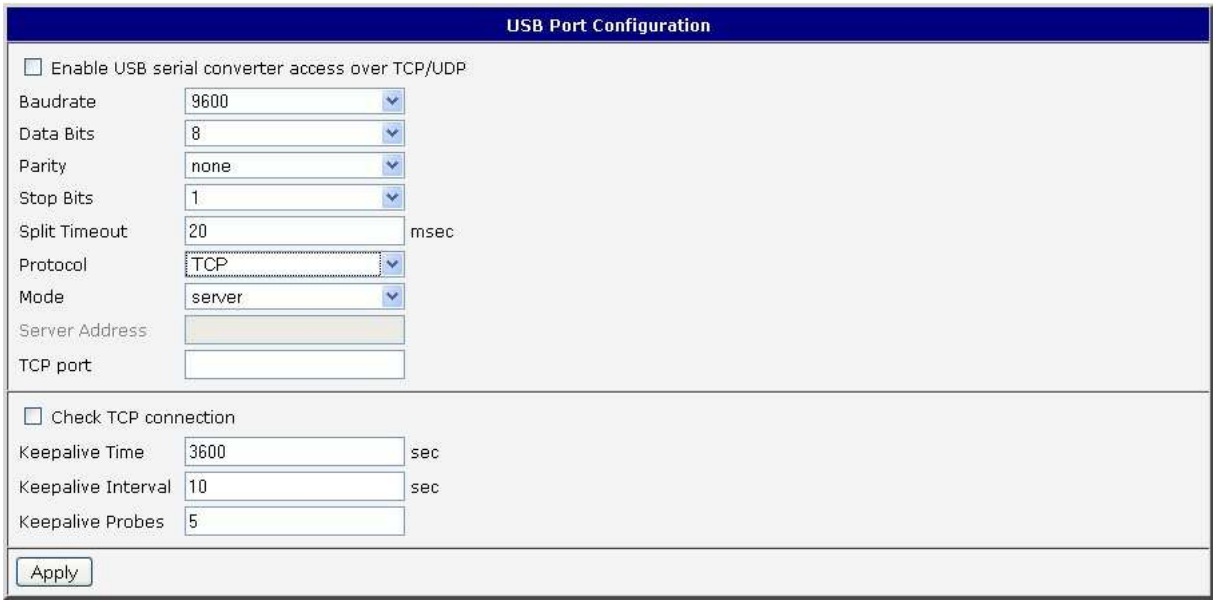
6.36.14. SMS Configuration


SMS Configuration
Send SMS on power up
Send SMS on PPP connect
Send SMS on PPP disconnect
Send SMS when datalimit is exceeded
Send SMS when binary input on I/O port (BIN0) is active
Send SMS when binary input on expansion port (BIN1-BIN4) is active
Phone Number 1
Phone Number 2
Phone Number 3
Unit ID *
BIN0 - SMS *
BIN1 - SMS *
BIN2 - SMS *
BIN3 - SMS *
BIN4 - SMS *
Enable remote control via SMS
Phone Number 1
Phone Number 2
Phone Number 3
Enable AT-SMS protocol on expansion port
Baudrate
9600
Enable AT-SMS protocol over TCP
TCP port
* can be blank
Apply

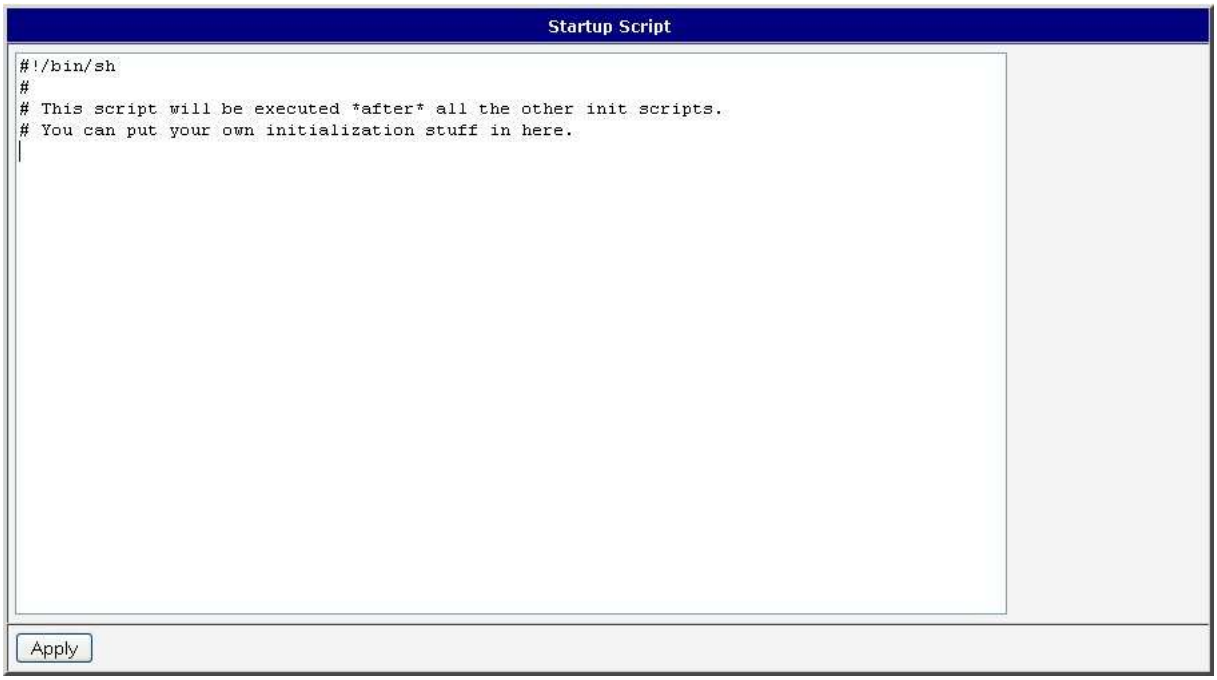
6.36.15. Expansion Port Configuration



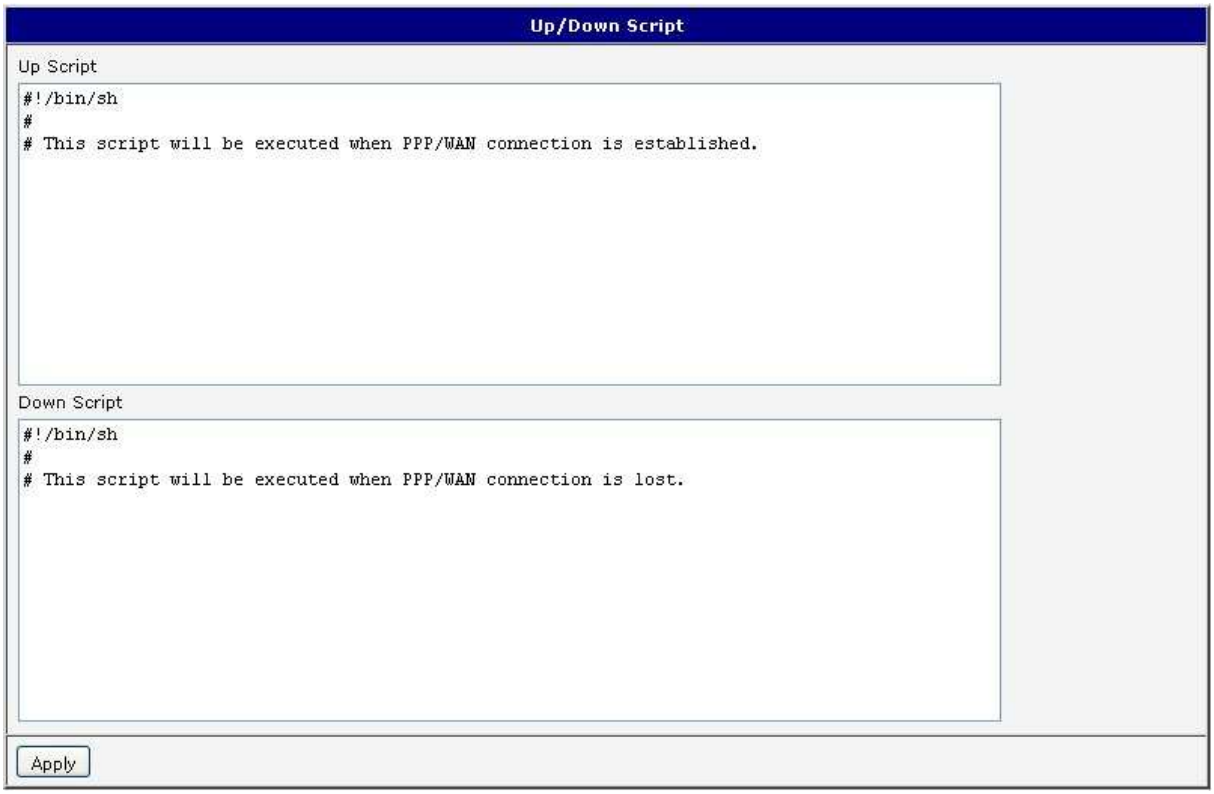
6.36.16. USB Port Configuration



6.36.17. Startup script


Startup Script
#!/bin/sh
#
This script will be executed *after* all the other init scripts.
You can put your own initialization stuff in here.
Apply

6.36.18. Up/Down Script



6.36.19. Automatic update

7. Configuration setting over Telnet

Attention! If the SIM card isn't inserted in the router, it is impossible for the router to operate. The Included SIM card must be activated for GPRS transmissions. Insert the SIM card when the router is switched off.

Monitoring of status, configuration and administration of the router can be performed by means of the Telnet interface. After IP address entry to the Telnet interface it is possible to configure the router by the help of commands. The default IP address of the modem is 192.168.1.1. Configuration may be performed only by the user "root" with initial password "root".

For Telnet exists the following commands:

Command	Description
cat	file contain write
cp	copy of file
date	show/change of system time
df	displaying of informations about file system
dmesg	displaying of kernel diagnostics messages
echo	string write
email	Email send
free	displaying of informations about memory
gsmat	AT commend send
gsminfo	displaying of informations about signal quality
gsmsms	SMS send
hwclock	displaying/change of time in RTC
ifconfig	displaying/change of interface configuration
io	reading/writing input/output pins
ip	displaying/change of route table
iptables	displaying/modification of NetFilter rules
kill	process kill
killall	processes kill
ln	link create
ls	dump of directory contain
mkdir	file create
mv	file move
ntpdate	synchronization of system time with NTP server
passwd	password change
ping	ICMP ping
ps	displaying of processes information
pwd	dump of actual directory
reboot	restart
rm	file delete
rmdir	directory delete
route	displaying/change of route table
service	start/stop of service
sleep	pause on set seconds number
slog	displaying of system log
tail	displaying of file end
tcpdump	monitoring of network
touch	file create/actualization of file time stamp
vi	text editor

8. Possible problems

Some network cards are able to be set in situation, when it is not possible to connect the router. It is possible to solve this problem in the following steps:

- hand by selection communication rates 10 MB/s in property network cards,
- connect router over switch,
- start computer only after finalizing the start of the router.

9. Reference

[1] Cinterion: **EES3_ATC_V01.100 – AT command Set, 2008**

10. FAQ

- I can't get from internet on equipment, which is connected to router and I have NAT enabled.
  - *The device's gateway has to be configured as the router.*
- Router resets itself, connection on Ethernet fails.
  - *It is necessary to use an antenna, which will be situated far from power supply.*
- I don't get on web server at NAT.
  - *The remote http access of the router has to be disabled, default server address has to be your web server and the gateway of the web server has to be the IP of router.*
- PPP connection fails.
  - *Check signal power. If signal power is weak, you will have to use a better antenna. If the environmental cells have a similar signal it will be necessary to use a directive antenna. Signal levels have to be in the range -50dBm and -90dBm.*
  - *It is necessary to set ping, which will check the connection and, in the case of fail ping, restart connection.*
- PPP connection won't be established.
  - *Recheck GPRS settings - APN, name, password and IP address.*
  - *Try to enter PIN – verification if the SIM card hasn't set PIN code.*
  - *In private APN it is appropriate to switch the DNS server send off.*
  - *Switch log system on and observe where the error turns up.*
- Connection fails on Ethernet or connection isn't establishing.
  - *On ethernet interface of the router it is possible to switch auto negotiation off and set a rate and duplex by hand.*
- DynDNS not function.
  - *In private APN not functional.*
  - *If the same IP address is recorded in your canonic name as dynamically assign address, it means that the operator is using NAT or firewall.*
  - *NAT is possible to verify by the help of the ping on address of your server with static IP address and by the help of the router address verify and address in ping.*
  - *Firewall is possible to verify, for example by remote access on web interface.*

- *The operator doesn't give out address DNS servers and without DNS server's it is impossible to connect to server dyndns.org. In log system will be this message:*
  - DynDNS daemon started,
  - Error resolving hostname: no such file or directory,
  - Connect to DynDNS server failed.

- IPSec tunnel is establishing but communication doesn't function.
  - *Probably it is badly set up route conditionals of connected equipment or it is bad set up GW.*
- FTP doesn't function.
  - *Router doesn't support the active FTP mode, supports the passive mode only.*
- RS232 doesn't function.
  - *It is necessary to verify present the expansion port RS232.*
  - *Verify present the expansion port RS232 in router configuration in menu „external port", or verify connection locally by the help Telnet-Hyper terminal.*
- L2TP or IPSec isn't establishing.
  - *Verify the reason in the log system.*
- I switched the router to offline mode by the SMS message, but the router is in online mode after restart.
  - *Control SMS message doesn't change the router configuration. If the router is switched to offline mode by the SMS message the router will be in this mode up to next restart. This behaviour is the same for next all control SMS messages.*

11. Customers support

Up to date information about the product is on website:

http://www.conel.cz/

Upkeep-advices:
The SIM-card must be handled carefully as with a credit card. Do not bend, do not scratch on this and do not expose to static electricity.
During cleaning of the modem do not use aggressive chemicals, solvents and abrasive cleaners!

Conel Company hereby declares that the modem narrated in this user's guide fits all basic demands of directive 1999/5/EC (R&TTE).

Modem fits values of coefficient SAR defined by association ICNIRP and values of "About protection of health before non-ionized radiation".

CE Declaration about consistency was issued and is possible get it at producer.

12. Product disposal instructions

The WEEE (Waste Electrical and Electronic Equipment: 2002/96/EC) directive has been introduced to ensure that electrical/electronic products are recycled using the best available recovery techniques to minimize the impact on the environment. This product contains high quality materials and components which can be recycled. At the end of it's life this product MUST NOT be mixed with other commercial waste for disposal. Check with the terms and conditions of your supplier for disposal information.

13. Guarantee Claim Guidelines

Dear customer,

The product that you have purchased was tested by the manufacturer and, before it was sold, the product's functions were checked once more by our company's technician. However if, in spite of the above-mentioned measures, a breakdown of this product occurs during the guarantee period, which makes proper utilization of the product impossible, we ask you to observe the Guarantee Claim Guidelines when asserting a guarantee claim.

To facilitate the possible guarantee claim procedure, please, when taking over the product, make sure that the seller, who is selling you the product, has properly filled in the relevant parts of the guarantee certificate, including the date of sale, stamp and signature.

This guarantee claim procedure applies to the products that have been purchased. This guarantee claim procedure does not apply to the services that have been provided.

Guarantee periods of products

Guarantee of the purchased device, power supply unit, antenna, data cable, and possible accessories is provided, with a guarantee period of 24 months from the date of sale. The date of sale is at the same time the date of acceptance of the product by the customer.

Lodging a guarantee claim

The guarantee claim must be lodged at the seller from whom the relevant object of the guarantee claim has been purchased. When lodging the guarantee claim, the customer is to submit the properly filled-in guarantee certificate and the complete object of the guarantee claim. The object of the guarantee claim should be submitted in a state corresponding to the state at the sale.

Caution!

The seller does not guarantee that individual settings or data stored in the object of the guarantee claim will be retained.

When lodging the guarantee claim, the customer is obligated to specify the particular defect of the guarantee claim object, possibly its symptoms and, furthermore, the particular right resulting from the liability for defects that he is asserting.

Settling a guarantee claim

Depending on the circumstances, the seller shall ensure the defect removal free of charge; possibly, the seller shall exchange the object of the guarantee claim for a new product or, possibly, settle the guarantee claim in a different way which is in compliance with the Civil Code and with the Consumer Protection Act.

At the moment when the customer has lodged the guarantee claim and the object of the guarantee claim has been accepted by the seller, running of the guarantee period is interrupted. Running of the guarantee period shall continue from the date of acceptance of the repaired object of the guarantee claim or of the exchanged faultless product by the customer or, in the event that neither of the two has been accepted by the customer, from the date when the customer was obligated to accept the repaired object of the guarantee claim or the exchanged product. In the event that a guarantee claim resulting from a defect covered by the guarantee has been lodged and the defective object of the guarantee claim has been exchanged by the seller for a new product (including the exchange of the IMEI), the ownership of the original object of the guarantee claim is passed

hereupon onto the seller, and the ownership of the new product, onto the buyer. A new guarantee period starts running from the date of acceptance of the new product. In the event that the seller, upon agreement with the customer, has settled the guarantee claim by exchanging the object of the guarantee claim for a faultless product, the new guarantee of the product shall expire as follows:

1. After the expiration of a period of 12 months from the date of acceptance of the exchanged product by the customer.
2. On the date when the guarantee period of the original product (the object of the guarantee claim) would have expired if the original product had not been exchanged, whichever is later.
3. The guarantee claim is not justified if the defect being claimed has not been detected by the seller within the framework of the guarantee claim settlement, or if the guarantee does not apply to the defect of the product pursuant to Article 4 of the Guarantee Claim Guidelines.
4. If the defect being claimed has not been detected, and the functional state of the guarantee claim object has been demonstrated to the customer, the customer is obligated to refund the provable expenses incurred in connection with expert assessment of the defect being claimed.
5. If, during the process of assessment of justifiability of the guarantee claim, a defect of the product is detected which is not covered by the guarantee (a repair not covered by the guarantee), the seller shall notify of this fact the customer, and the customer shall notify the seller whether he wants to have this defect removed at a price quoted by the seller. Precise conditions of the repair not covered by the guarantee will be specified in a drawn-up report signed by the customer and seller. If the customer does not require the defect removal by a repair not covered by the guarantee under the conditions communicated by the seller, the device will be returned to the customer, after he has refunded the provable expenses incurred in connection with the expert assessment of the claimed defect.

The guarantee does not apply to the defects caused by the following:

1. Mechanical damage (e.g. by a fall, etc.).
2. Utilization of power supply units and other accessories that are not suitable, possibly, are not recommended for the particular product.
3. Interconnecting the product with non-standard accessories.
4. Installation or utilization of the product in contradiction to the operating instructions, or utilization of the product for purposes that are not usual for this type.
5. Incompetent handling, possibly intervention into the product by an unauthorized person or by a repair shop that has not been authorized by the manufacturer.
6. Damage caused by the natural elements (flooding, fire, etc.) or by other local effects (storm, mains over voltage, etc.).
7. Storage under conditions outside the temperature range.
8. Operation in a chemically aggressive environment.

Other guarantee claim conditions

The fact that the object of the guarantee claim does not correspond to parameters that have been set for other similar types of products can not be considered to be a defect. For the assessment whether a defect has occurred, the product parameters included in the technical documentation of the product are decisive.

The guarantee shall be terminated in the event of any modification of the object of the guarantee claim or in the event that the serial number of the object of the guarantee claim has been damaged or is illegible due to other reasons.

14. Guarantee certificate

Type of the device	
Serial number	
Guarantee period (in months)	
Seller	
Date of sale	
Stamp of the seller	

LUCOM GmbH * Ansbacher Str. 2a * 90513 Zirndorf * Tel. 09127/59 460-10 * Fax. 09127/59 460-20 * www.lucom.de

	1	2	3	4	5
Date of reception of the guarantee claim by the seller					
Number of the guarantee claim report					
Date of reception of the device into the repair shop					
Date of completion of the repair by the repair shop					
Number of the receipt form of the repair shop					
Guarantee repair	**YES – NO**	**YES – NO**	**YES – NO**	**YES – NO**	**YES – NO**
New serial number of the device (IMEI)					
Comments					
Stamp of the repair shop					

LUCOM GmbH * Ansbacher Str. 2a * 90513 Zirndorf * Tel. 09127/59 460-10 * Fax. 09127/59 460-20 * www.lucom.de